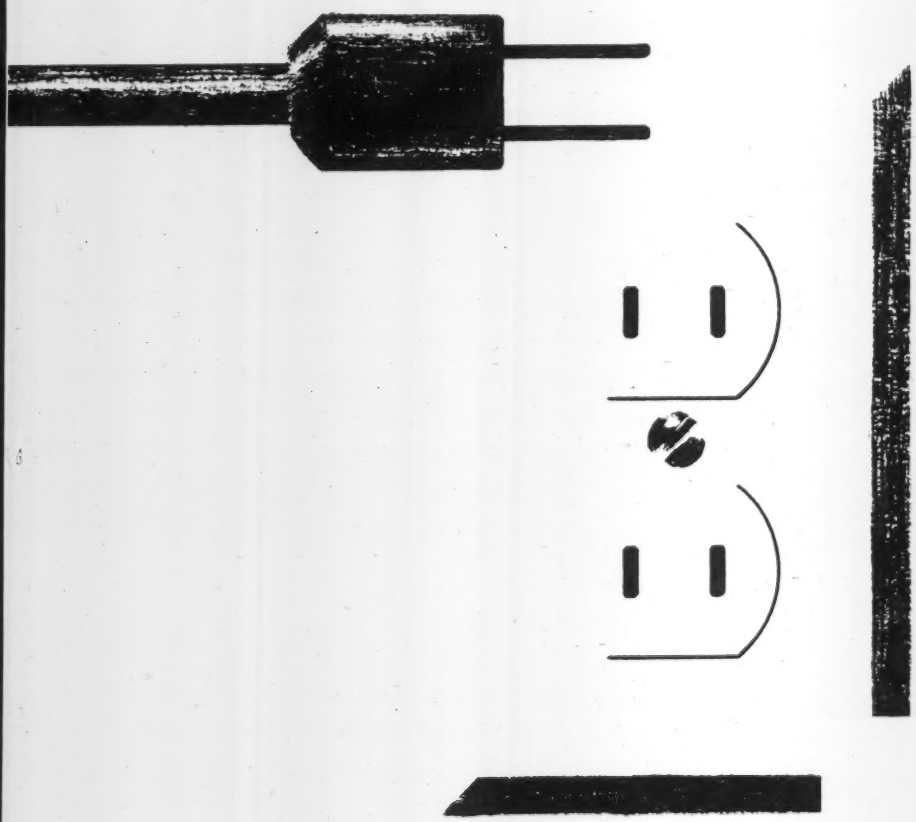
DECEMBER 21, 1953

STEEL

THE WEEKLY MAGAZINE OF METALWORKING



Outlook for Appliances

— see page 40

✓ **PLANT, EQUIPMENT SPENDING SOARS**
Record in '53, Near-Record in '54, p. 37

✓ **HI-TEMP ALLOY SKIMPS ON NICKEL**
Same Physicals, Better Ductility, p. 68

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Another Tough Motor Problem Licked

Enclosed Water-Cooled Design Keeps Out Iron Oxide to Cut Maintenance and Add Dependability

In revamping the high pressure water system at the *Gary Steel Works'* 38-inch strip mill, *United States Steel Corporation* engineers encountered a serious problem. For most efficient installation and operation, one of the descaling pumps and its motor belonged right in the mill. But iron oxide from slabs tends to clog air-cooled motors . . . imposing an impractical cleaning schedule on maintenance crews.

Drawing on experience gained in solving a variety of special motor problems, Allis-Chalmers designed the 1500-hp, 6900-volt, 3580-rpm, water-cooled cage motor shown above.

With its totally enclosed design, incorporating an air-to-water heat exchanger, this motor rarely needs cleaning. Moreover, motor life is lengthened and reliability increased because insulation is protected and uniform temperatures are maintained. (For more information about water-cooled motors, ask for Bulletin 05B7682.)

Bring *Your* Motor Problems to A-C

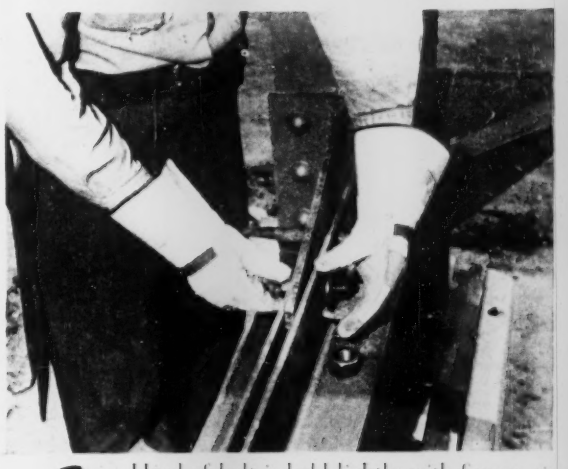
Whether you need a single motor or electrical equipment for a complete rolling mill, Allis-Chalmers can supply equipment to suit the application. So for help in solving your motor problems, contact your A-C representative, or write to Allis-Chalmers, Milwaukee 1, Wisconsin.

A-4164

ALLIS-CHALMERS

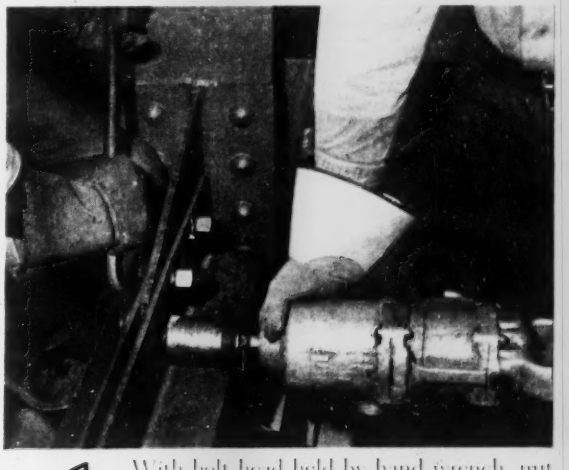
Here's the quick and easy way to join structural members

1 The holes are aligned, using one or more drift pins. Then the worker inserts the bolt, placing hardened washer under bolt head.

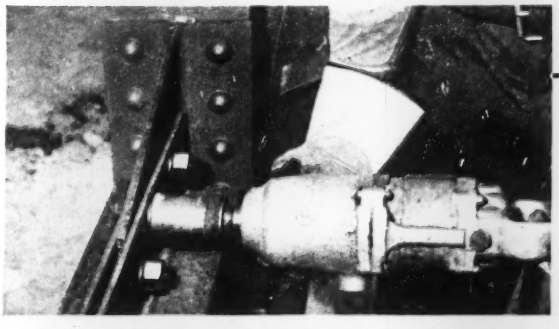


2 Head of bolt is held lightly with fingers as second hardened washer is slipped into place over threaded portion of the bolt.

3 Hexagonal nut is run up on the bolt. At each joint, the initial bolt is tightened sufficiently to keep holes in alignment. Then pins are replaced with bolts.



4 With bolt head held by hand wrench, nut is quickly torqued with pneumatic impact wrench. That's all there is to it! The whole operation takes less than the time to describe it. No wonder this time saving way of erecting steel with high strength bolts is growing more popular every day!



◀ *Alternative Method* The Bethlehem High Strength Bolt may also be installed by one man. With this method, the nut is first drawn up as far as possible with the hand wrench. Then the impact wrench is used alone.

BETHLEHEM STEEL COMPANY
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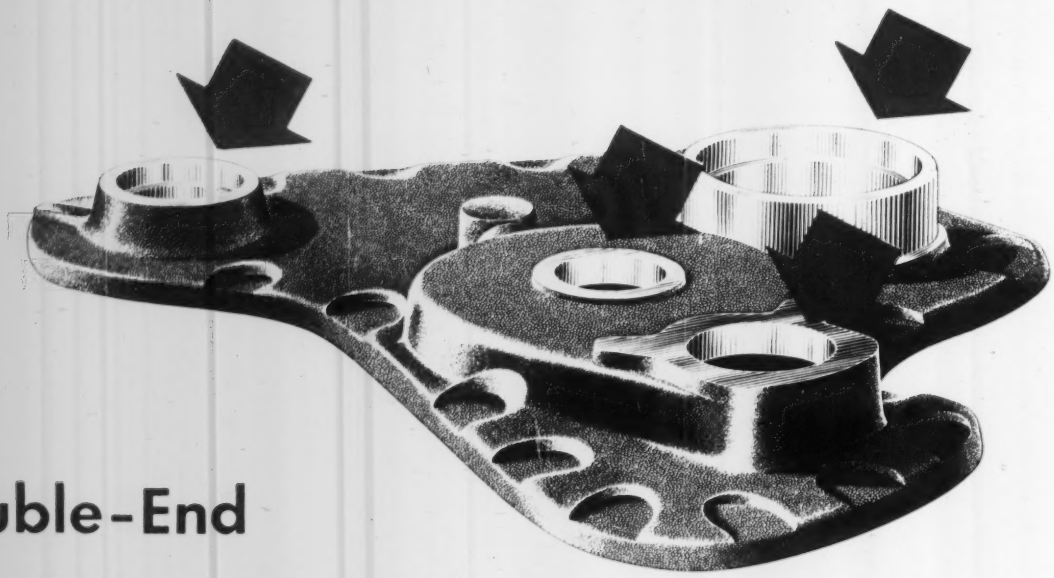
On the Pacific Coast Bethlehem products are sold by: Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM HIGH-STRENGTH BOLTS

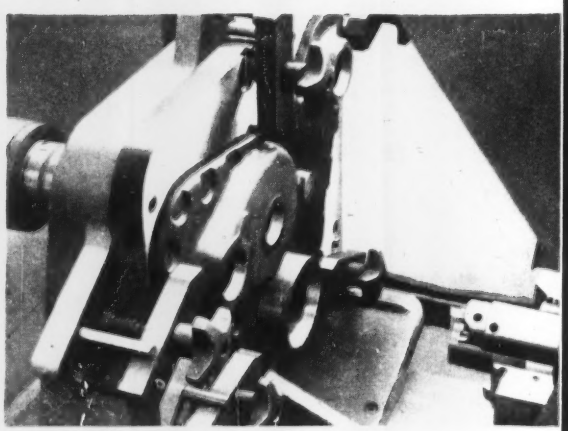


Double-End Heald Bore-Matic does a 5-HOUR JOB in 12 MINUTES

• Precision finishing the four bearing holes in this gear case cover used to be a 5-hour job — requiring separate operations on different machines. But now it's done in *12 minutes flat* — on a single Heald Model 322 Bore-Matic. That's a saving of 4 hours and 48 minutes per part!

All operations, including boring, facing, chamfering and turning, are performed at a single loading, in one high-speed automatic cycle. Four boringheads are used — one on the left-hand bridge and three on the right. The work is automatically presented to the two sets of heads in sequence, after which it returns to center for reloading.

Remember — when it comes to precision finishing, it pays to come to Heald.



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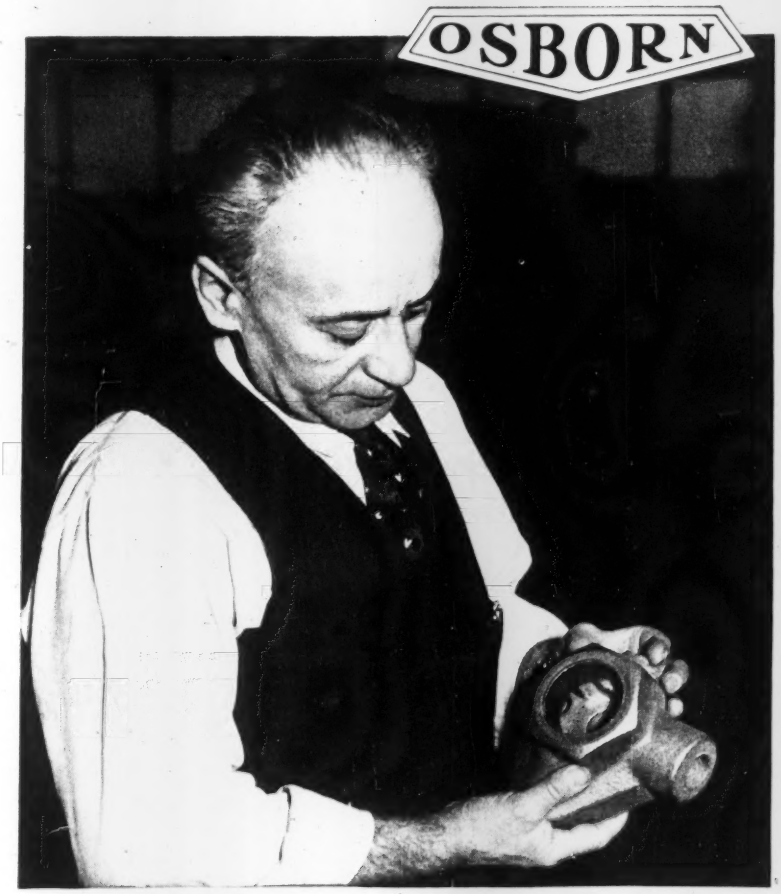
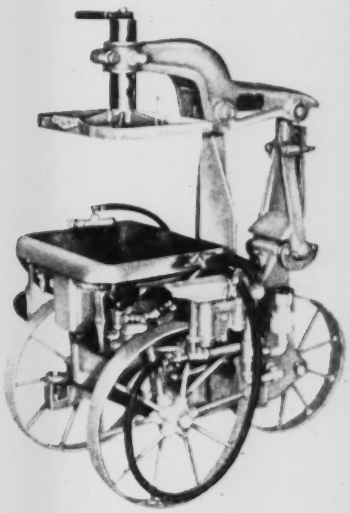


TOP PERFORMER IN THE FOUNDRY INDUSTRY



Osborn Jolt Squeeze 275J. One of OSBORN'S *complete* line of foundry molding machines. Designed for accurate, dependable production, low cost operation.

How accurate castings can cut your machining costs

SIMPLY by improving the accuracy . . . the quality of your foundry molds through use of modern molding and core blowing machines, it is possible to reduce machining costs three ways:

1. Accurate castings are uniform in size . . . less metal is needed for finishing.

2. Less time is needed to load uniform castings in chucks or holding fixtures. Extra grinding operations on oversized castings are eliminated.

3. Uniformity of machine rammed molds and cores reduce scrap casting losses. Machines make molds and cores faster, too.

INVESTIGATE NOW. Have an Osborn foundry-trained molding specialist analyze your operations. You can profit from his long experience in improving the quality of castings . . . cutting foundry molding costs. Write *The Osborn Manufacturing Company, Dept. EE13, 5401 Hamilton Avenue, Cleveland 14, Ohio.*

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Osborn Molding Machines

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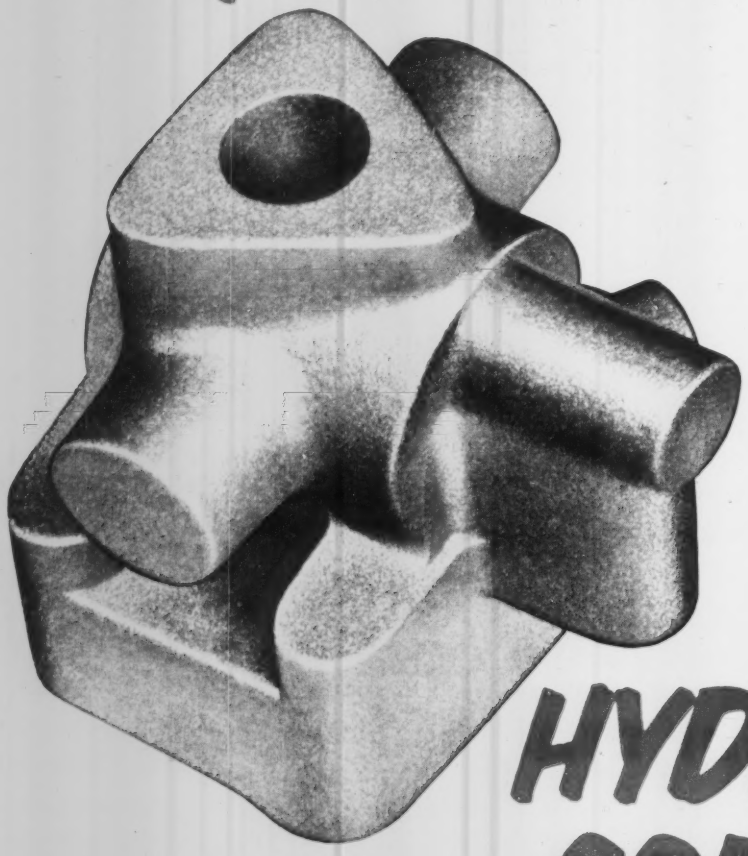
Eaton Permanent Mold Gray Iron Castings—



for HYDRAULIC CONTROLS

Send for your free copy of the 32-page illustrated booklet: "The Eaton Permanent Mold Foundry." It tells the story of Permanent Mold Castings and takes you on a picture-tour of the Eaton Foundry at Vassar, Michigan.

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This Week in Metalworking

STEEL

Vol. 133 No. 25 December 21, 1953

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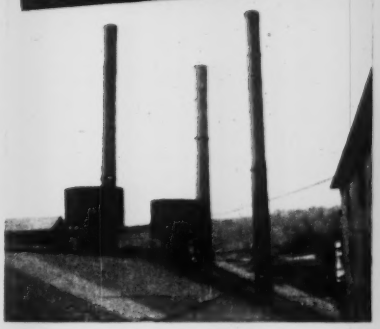
FUME STACKS of PLA-TANK®



Day by day, more and more PLA-TANK Stacks go to work helping to solve corrosion problems.

PLA-TANK STACKS are manufactured from long-life resin-bonded glass fiber.

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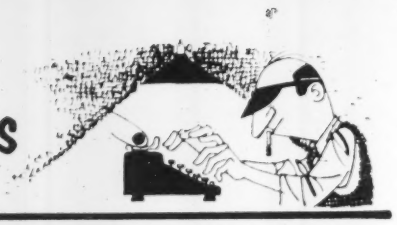
behind the scenes



On the Banquet Circuit

There is a movement underfoot . . . far-underfoot, we might add . . . to form a Society for the Prevention of Cruelty to Association Memberships That Must Listen to STEEL Editors Orate. The critical need for the SFTPOCTAMTMLTSEO has been accentuated in recent weeks by the growing demand for STEEL editors on the banquet circuit.

During the past five weeks, for example, a quartet of editors including Earl Shaner, editor-in-chief; Irwin Such, editor, Walter Campbell, managing editor; and John Morgan, assistant managing editor, have completed a total of seven speaking engagements. Dr. Allen Gray, technical editor, is scheduled for two talks early in 1954.

Some of the groups which have invited STEEL editorial department representatives to address them are the Small Manufacturers Institute, Personnel & Industrial Relations Institute, Steel Warehouse Product Association, Cleveland Advertising Club Public Relations' Division, Industrial Marketers of Detroit, National Federation of Metal Finishers and the American Electroplating Society.

Our editors are pleased to speak before the memberships of these and other distinguished organizations. They bring to their audiences all the know-how they command. As editors of STEEL, they have an intimate knowledge of the metalworking industry and are happy to share it with any group which can benefit from their experiences.

Shrdlu, also, is a speaker of sorts. Our repertoire includes a snappy version of "Lincoln's Gettysburg Address" with gestures, but let's face it, Shaner, Such, Campbell, Morgan and Gray make much more sense.

More *Yearbook* Previews

During the past few weeks we have been previewing the editorial features scheduled for publication in STEEL's 1954 *Metalworking Yearbook* issue, Jan. 4. Here are a few others being currently whipped into shape for your reading pleasure.

"Automakers Prepare for Buyers' Market:" In 1954, the competitive battle among automakers will be for buyers rather than for materials. As we look through the tailgate of 1953, we see the Big Three getting their sales muscles in shape for as rough and tumble a catch-as-catch-can as we have seen in recent years. In the lighter weighted matches, it could well be a struggle for survival. Thousands of materials, parts and service suppliers will be watching the contest with great anxiety—perhaps you are one of these.

"What Can Business Expect from Washington:" The Eisenhower administration's first year was largely devoted to unsnarling controls and restoring a substantial measure of freedom to the business community. The second year will bring reform to the tax structure and a clearer definition of the nation's defense policy.

Both these features make interesting and important reading. The *Metalworking Yearbook* for 1954 begins to take on the framework of the most important *Yearbook* issue yet published. Suggest you keep on the lookout for your copy. You'll be glad you did!

A Style All Its Own

We were speaking to some of the boys on the Technical Staff just the other day about the wonderful new style they have built into their stories in recent months. Have you noticed it?

We like to call it technical-news-reporting. It reports the news-aspect of a technical development in fast-moving, interesting style. Then, for the reader who prefers more of the technological detail, graphs, tables, charts and boxed checklists are injected as supplementary material at strategic points throughout the story. Thus, the material can be read quickly for news or slowly for basic data.

Incidentally, we are particularly proud of the fact that 100% of the editorial material appearing in STEEL whether contributed by an industry specialist or staff written is reworked by our editors to conform to the style described above.

Shrdlu

(Metalworking Outlook Page 29)

Wellman will build it

Special Cranes
Ore Unloaders
Charging Machines
Forging Manipulators
Car Dumpers
Gas Flue Systems
Gas Reversing Valves
Coke Pushers
Mine Hoists
Skip Hoists
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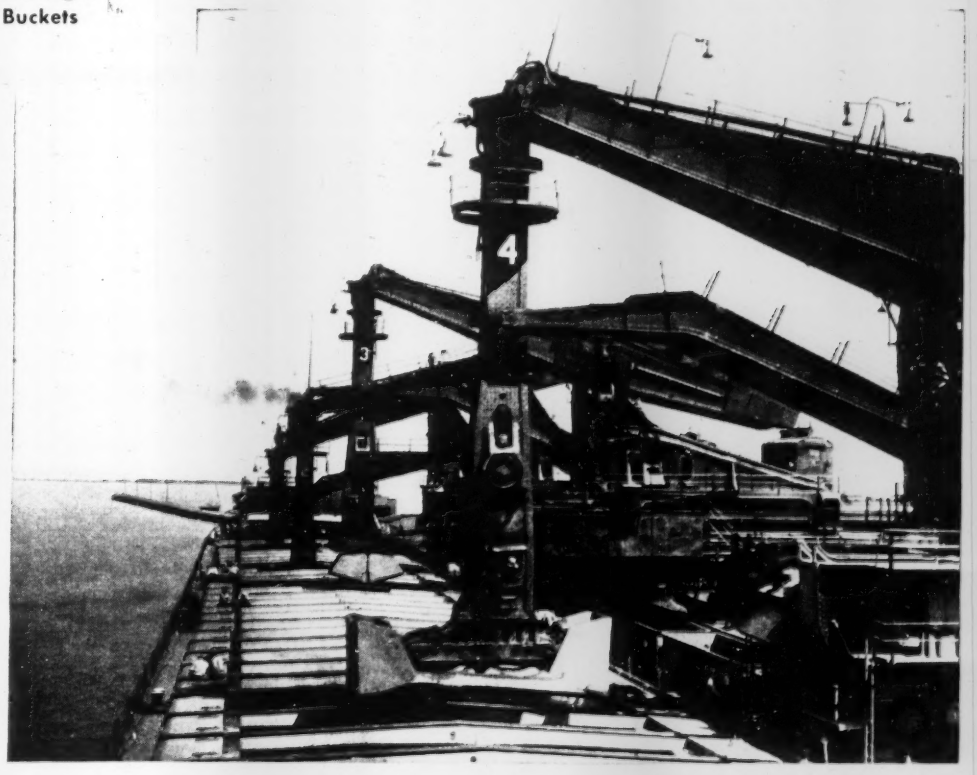
Exclusive Wellman Hulett-Type ore unloaders

handle most of lake-shipped ore



Four of an installation of five Wellman Hulett-Type unloaders in use at one of the largest ore docks on the Great Lakes.

• Wellman Hulett-Type unloaders handle by far the most of all lake-shipped ore. Their speedy, dependable performance contributes much to the economy of the modern ore dock. They are a product of Wellman's more than half-century of engineering experience and achievement.

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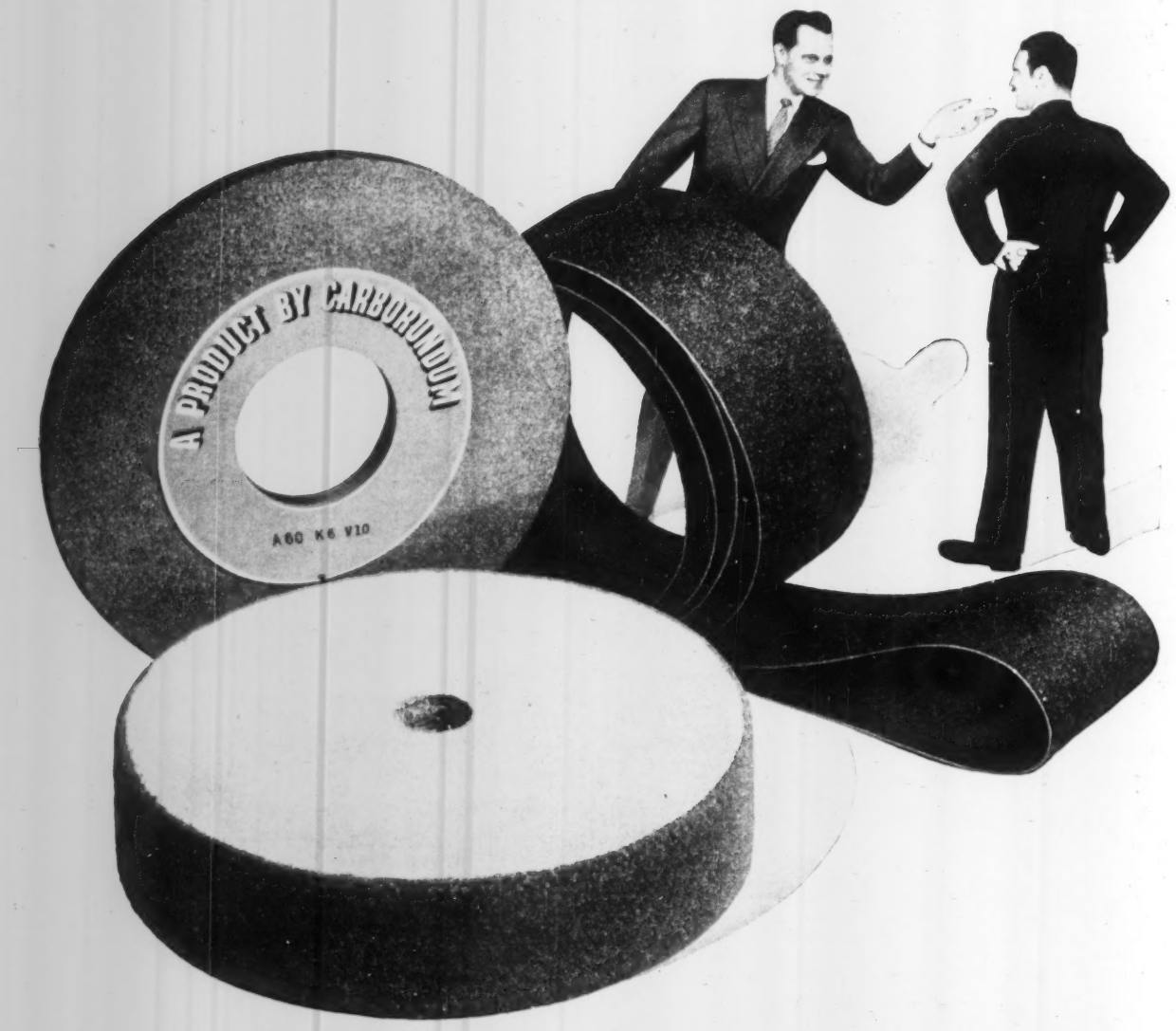

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Take off-hand grinding, for instance. You can count at least 7 different abrasive methods of off-hand grinding. How can you be *sure* the method you are using is the best —the lowest in cost? By asking CARBORUNDUM . . . for CARBORUNDUM alone has a complete, branded line of grinding wheels *and* abrasive belts *and* tumbling and polishing grains. Only CARBORUNDUM can recommend without bias, on the sole basis of what's best for you.

Or suppose you manufacture fountain pens. You can finish and polish the barrels with abrasive belts or grinding wheels . . . you slit the points with a tiny grinding wheel . . . finish the clips with tumbling abrasives. CARBORUNDUM alone gives you *one-source control* of abrasive quality, on every type of abrasive you use . . . quality that's constant, identical, dependable—thus economical.

Several ways to do one operation? Call in CARBORUNDUM. Several processes on one part? Call in CARBORUNDUM. Either way, you win.

Call your CARBORUNDUM *Salesman or Distributor* today!

He's your best bet for complete stocks, prompt delivery . . . and best of all, experienced counsel on *every* new development in the *entire* field of abrasives. He's in the yellow pages under "Abrasives" or "Grinding Wheels." Phone him today—it's to your profit!

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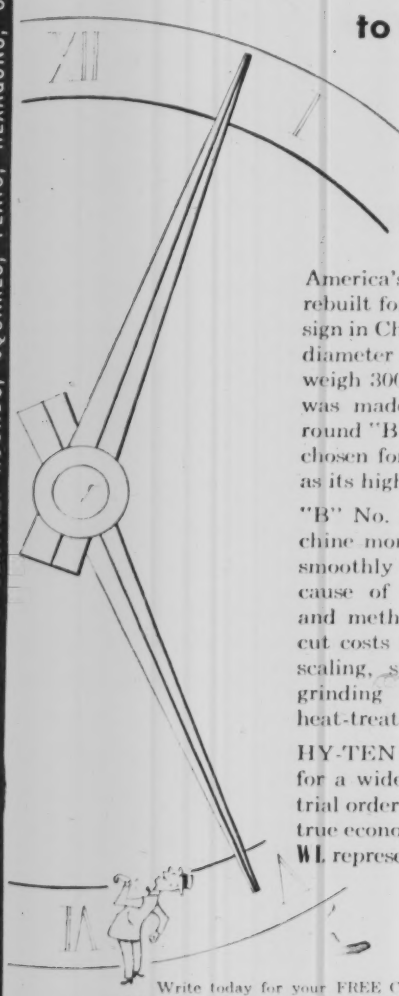
it's the right time

to Investigate the Qualities of

HY-TEN

ALLOY STEEL



America's largest clock was recently rebuilt for a spectacular illuminated sign in Chicago. It measures 50 ft. in diameter — hands and movement weigh 3000 lbs. The new driveshaft was made from 6 ft. of 3½-inch round "B" No. 3X heat-treated bar, chosen for its machinability as well as its high physical properties.

"B" No. 3X heat-treated bars machine more readily and finish more smoothly than standard alloys because of their particular analysis and method of manufacture. They cut costs by eliminating distortion, scaling, straightening — and often grinding — as well as the cost of heat-treating finished parts.

HY-TEN "B" No. 3X bars are used for a wide range of applications. A trial order will convince you of their true economy. Just call your nearest WL representative.

Write today for your FREE COPY of the Wheelock, Lovejoy Data Book, indicating your title and company identification. It contains complete technical information on grades, applications, physical properties, tests, heat treating, etc.

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LETTERS TO THE EDITORS

More About MAPI Formula

I am interested in knowing more about the Machinery & Allied Products Institute formula of re-equipment as discussed in your Machine Tool Buyers' Guide (Nov. 16, Section II, p. 8). Would you please tell me where I can get the information.

Fleming W. Johnson
vice president and director of manufacturing
J. P. Seeburg Corp.
Chicago

We would like to obtain a copy of the MAPI formula . . .

H. M. Gage
purchasing agent, special products
Columbia-Geneva Steel Division
U. S. Steel Corp.
San Francisco

• *For further information on MAPI's replacement philosophy get in touch with the Machinery & Allied Products Institute, 120 S. LaSalle St., Chicago 3.—ED.*

Who and Where Department

I read your article "Dual Frequency Heating: Lower Costs Open New Fields" (Apr. 13, p. 140) and I would like very much to get in touch with the author, M. E. Hackstedde, manager, GECO Inc., Cleveland. I wrote to Mr. Hackstedde in care of GECO Inc., Cleveland, but the letter was returned because it bore no street address.

Maximillian Lobley
Lobley Machine Works Inc.
Brooklyn, N. Y.

• *Write to Mr. Hackstedde in care of the Carr-Liggett Advertising Agency, 512 NBC Bldg., Cleveland 13.—ED.*

Locate Plating Article

I understand that fairly recently STEEL ran an article on the vacuum process of metal coating. If you can find me a copy, it would be greatly appreciated.

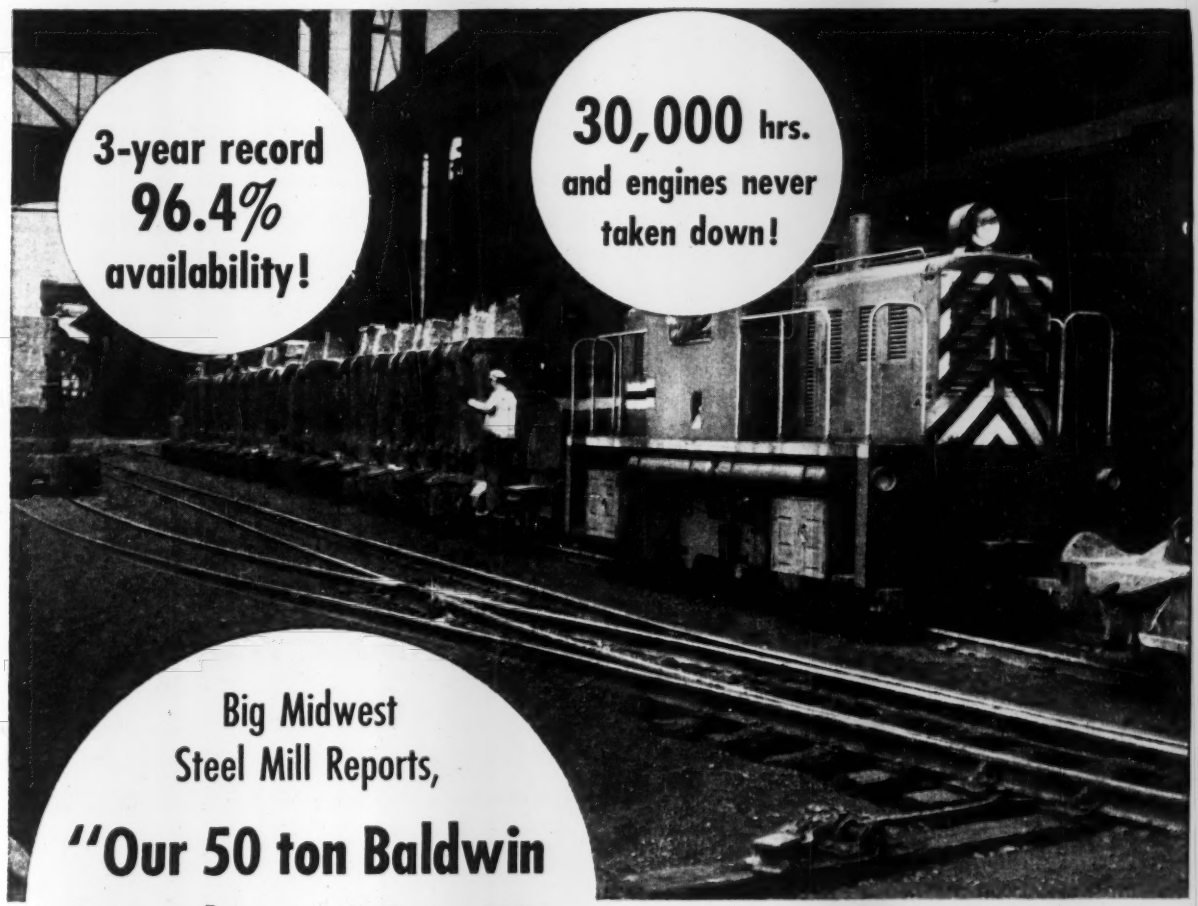
J. Roy McLennan
K. C. Shenton Advertising Service
Hartford, Conn.

• *That article was "Vacuum Process Brightens Plating Picture" which appeared in the Aug. 17 issue. A tear sheet is sent.—ED.*

Needs Qualification

In your Nov. 30 issue, you have a very interesting article "No Lid on Containers" (p. 66) which deals in part with electrolytic tin plate. But I noticed you said that the first electrolytic tinning line was started in 1942. Actually, I think if you check into this you will find that there was an electrolytic line operating in Gary, Ind.

Please turn to p. 12



Big Midwest
Steel Mill Reports,

"Our 50 ton Baldwin Diesel gets 25 to 30 heats out on time every day!"

When it costs hundreds of dollars for every delay of a minute in getting a heat out and the ingots to the blooming mills and soaking pits, efficient, dependable locomotives are indispensable to a steel mill. A major steel mill in the midwest reports a remarkable record of money-saving performance by their Baldwin industrial diesel-electric locomotive:

"Our 50-ton Baldwin replaced two steam locomotives on the hot line moving ingots to the blooming mills and soaking pits. We tap 8 to 10 heats a shift, three shifts a day. The heats run as much as 150 tons, making many of the loads for the Baldwin 594 tons which theoretically would require a 32% heavier diesel. But this Baldwin has handled *every* job 24 hours a day for over 3 years in spite of the extreme heat, bad curves and rough track conditions on this run. It is taken off the job each week two hours for inspection and lubrication. No major repairs have been necessary during 30,000 hours of operation."

In mine or mill, you, too, can depend on similar economy and dependability by switching to and with Baldwin Industrial locomotives.

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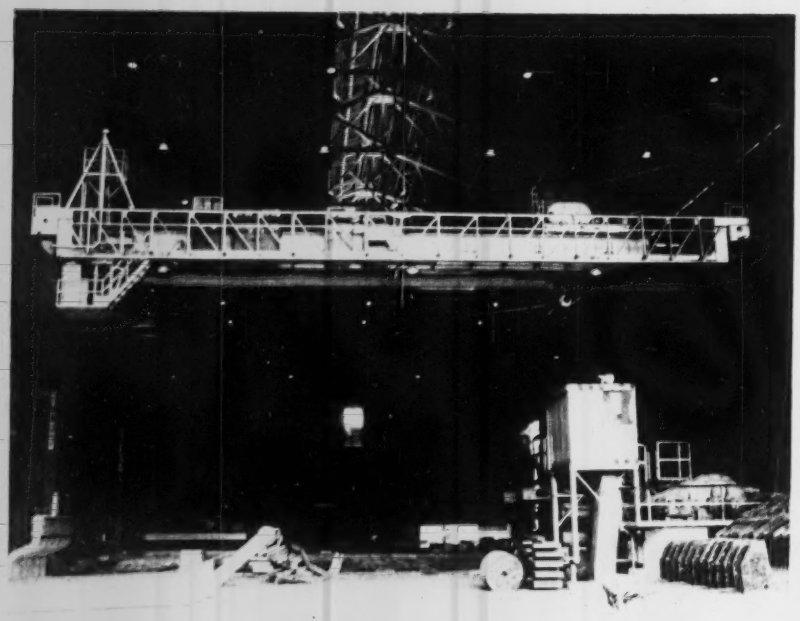
BALDWIN – LIMA – HAMILTON

INDUSTRIAL LOCOMOTIVES



25 ton Bedford Magnet Crane with 90 ft. span over the Blooming Mill Slab Yard in the new mill recently constructed by Detroit Steel Company at New Boston (Portsmouth), Ohio.

Another Bedford Crane for Detroit Steel

Proof of the superiority of Bedford Cranes is found in the high percentage of *repeat orders* from important owners through the years.

In steel mills, power plants, and throughout industry . . . wherever superior performance is *expected*, owners enthusiastically recommend Bedford Cranes.

Available in all types and sizes . . . from five tons to 350 tons and up . . . for all kinds of indoor and outdoor services . . . each Bedford Crane is individually engineered and precision built for its specific application.

Built to the most modern standards and backed by more than 50 years of specialized crane building *and utilization* experience . . . Bedford Cranes have won fame the world over for advanced design and for safe, smooth, dependable performance.

You are invited to consult a Bedford Engineer on your next crane problem . . . with all the facts on the table, we believe you too will make *your* next crane a Bedford.

(Write for complete catalog describing Bedford Cranes in detail.)

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STEEL MILL CRANES

BEDFORD

BEDFORD FOUNDRY & MACHINE COMPANY, INC. · BEDFORD, INDIANA

LETTERS

Concluded from p. 10

late in 1936 or early 1937 producing a salable product with the trade name of Ferrostan which is some six years earlier than you gave the industry credit for.

W. B. Gillies Jr.
executive vice president
Rust Engineering Co.
Pittsburgh

• *You're right. While we realized there had been much experimental activity before 1942, the Bureau of Census figures show no production of electrolytic tin plate prior to that date and we attempted to qualify our statement by use of the phrase "commercial operation." More accurately, it should have read "substantial commercial operation."—ED.*

Wealth in the Handbook

We have received the two copies of STEEL's Specifications Handbook and find it to be such an exceptional job of specification listing that we would like you to send us three more copies of it.

N. S. Morris
office manager
Whitehead Metal Products Co. Inc.
Cambridge, Mass.

We have just received the new STEEL's Specifications Handbook and we are truly impressed with its wealth of information and the ease of use. Will you kindly inform us how we can obtain five or six additional copies.

C. M. Lock
welding & methods engineer
Houston Division
Todd Shipyards Corp.
Houston, Tex.

• *STEEL subscribers can obtain additional copies of the STEEL's Specifications Handbook through the Readers' Service Department at $2.00 per copy. —ED.*

How Noisy Is Noise?

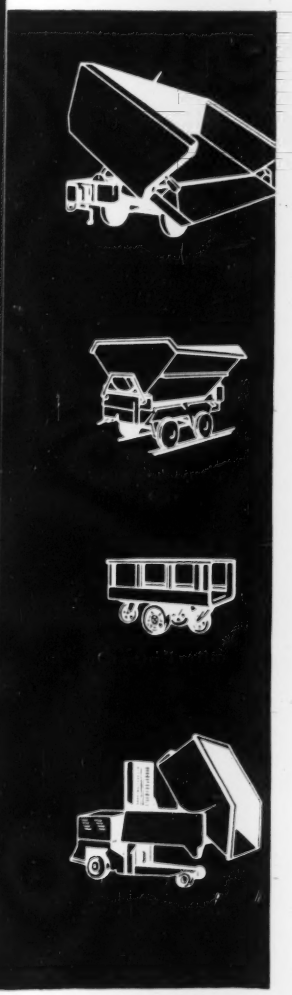
In the Oct. 26 issue of STEEL, there appears the article "The Sound of Industry: Not So Welcome" (p. 73).

The last sentence of the second paragraph refers to a study, to be published Nov. 15, which will cover such subjects as continuous and intermittent exposure to steady noise, impulsive noise, riveting noise, jet engine noise and drop forging noise. We are very much interested in securing a copy of that study.

G. W. Bach
Balancing Machine Division
Gisholt Machine Co.
Madison, Wis.

• *The study will be available from the Sales Department, American Standards Association, 70 E. 45th St., New York 17. Publication of the study has been delayed. Contact the association directly for the new publication date.—ED.*

EASTON simplified production and improved product with this CINCINNATI Press Brake



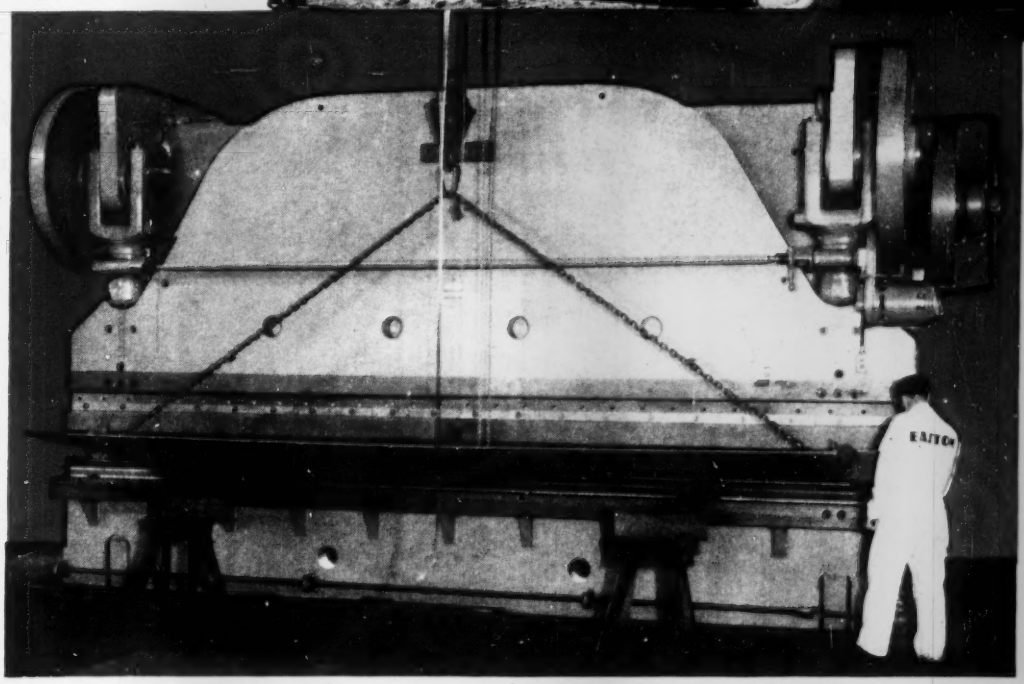


Illustration courtesy Easton Car & Construction Company, Easton, Pennsylvania.

Here a Cincinnati Press Brake is forming ½" plate for wide sections of off-highway trailers, at the Easton Car & Construction Company, makers of a large line of products for industrial transportation.

By using this Cincinnati Press Brake, some welding operations were eliminated, which improved the product, and reduced production costs at the same time.

The power, accuracy, and versatility of Cincinnati Press Brakes are reducing manufacturing costs where ever they are installed. If you form, or bend, you should investigate their possibilities.

Write for Press Brake Catalog B-4.

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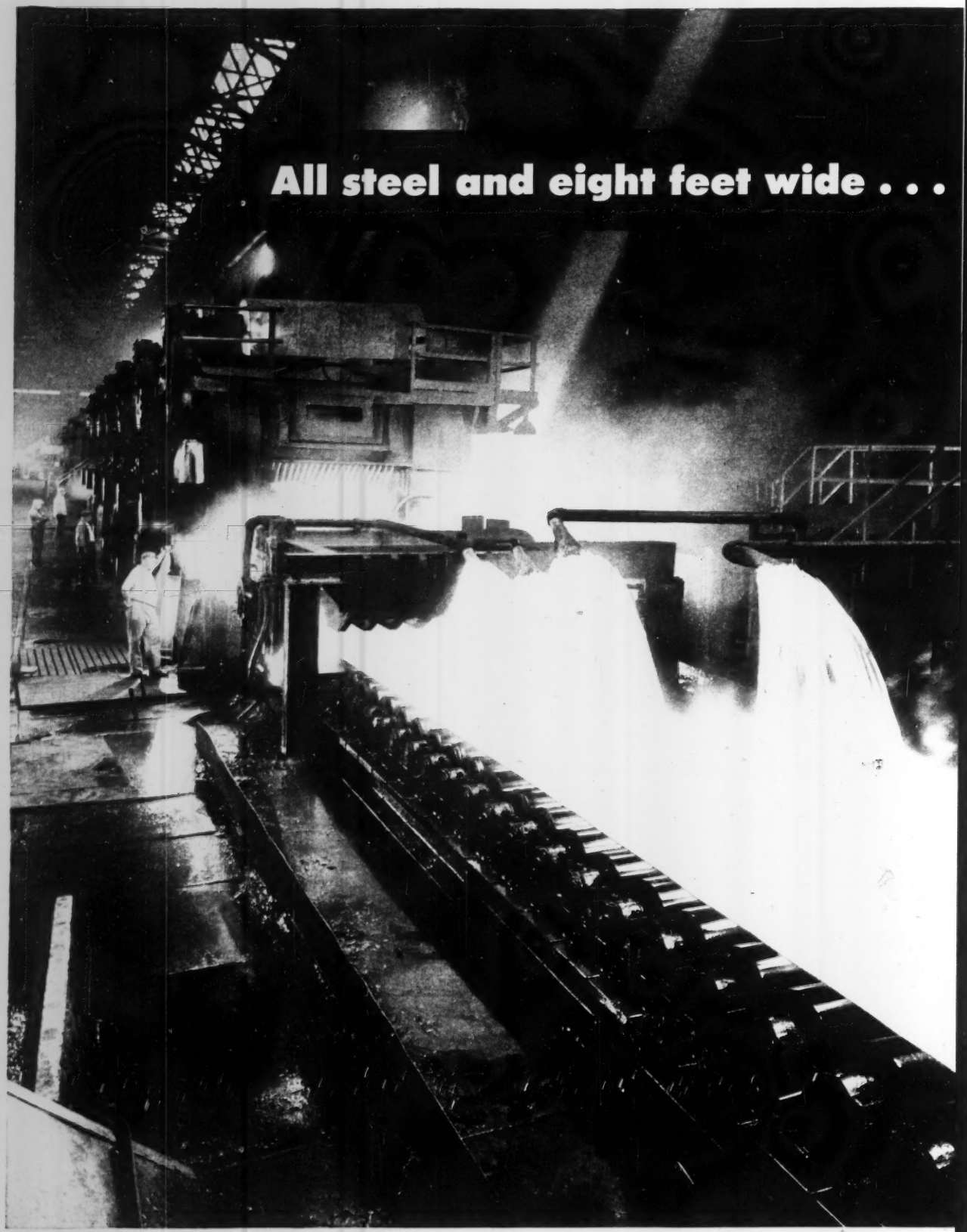
THE CINCINNATI SHAPER CO.

CINCINNATI 25, OHIO, U.S.A. SHAPERS • SHEARS • BRAKES



GREAT THINGS

STEEL

designed for the automotive industry

Here's the 96-inch strip mill at Great Lakes Steel. It makes a great, broad, beautifully smooth sheet that finally finds its way to your garage in the body of a sleek sedan. No one makes sheet steel any wider than this.

And not all steelmakers undertake to make it as wide. The reason Great Lakes does it is that Great Lakes set out in the first place, many years ago, to be a *dependable first source* of sheet, strip, and other shapes needed by manufacturers, particularly in the making of automobiles. That's what we are today, with an annual capacity that has reached four million ingot tons—about 25% of the carmakers' total needs for steel, and about 40% of their appetite for the kinds of steel we supply.

To put that wide sheet into the hands of automobile men—so that their heavy presses can draw the strong one-piece tops that mark today's closed cars—it takes a lot of steelmaking operations. At Great Lakes, we do all these operations ourselves. We start with the ore, and work it through blast furnaces, bessemers, open hearths, blooming mills, hot and cold rolling mills and merchant mills, right down to the finished forms. This integration gives us *flexibility* that lets us do a real job. Add our availability—here in the heart of the automotive industry—and you can see how we've come to qualify as that *dependable first source.*

Great Lakes is distinguished among steel suppliers not only as the industry's foremost specialist in flat-rolled products, but also as the developer of low-alloy, high-tensile steels now important to manufacturers. Many an engineer has been able to work out problems otherwise difficult to solve with the help of our N-A-X HIGH-TENSILE steel, whose formability and corrosion-resistance, among other advantages, suit it to a number of tough jobs.

You can expect more great things to happen at Great Lakes Steel. For we aim to serve well our many customers in many fields, while keeping pace with the increasing needs of the mighty automotive industry. *Great Lakes Steel Corporation, Detroit 29, Michigan.*

Offices also in Chicago, Cleveland, Grand Rapids, Lansing, New York, Philadelphia, St. Louis and Toledo.

Great Lakes Steel

NATIONAL STEEL CORPORATION

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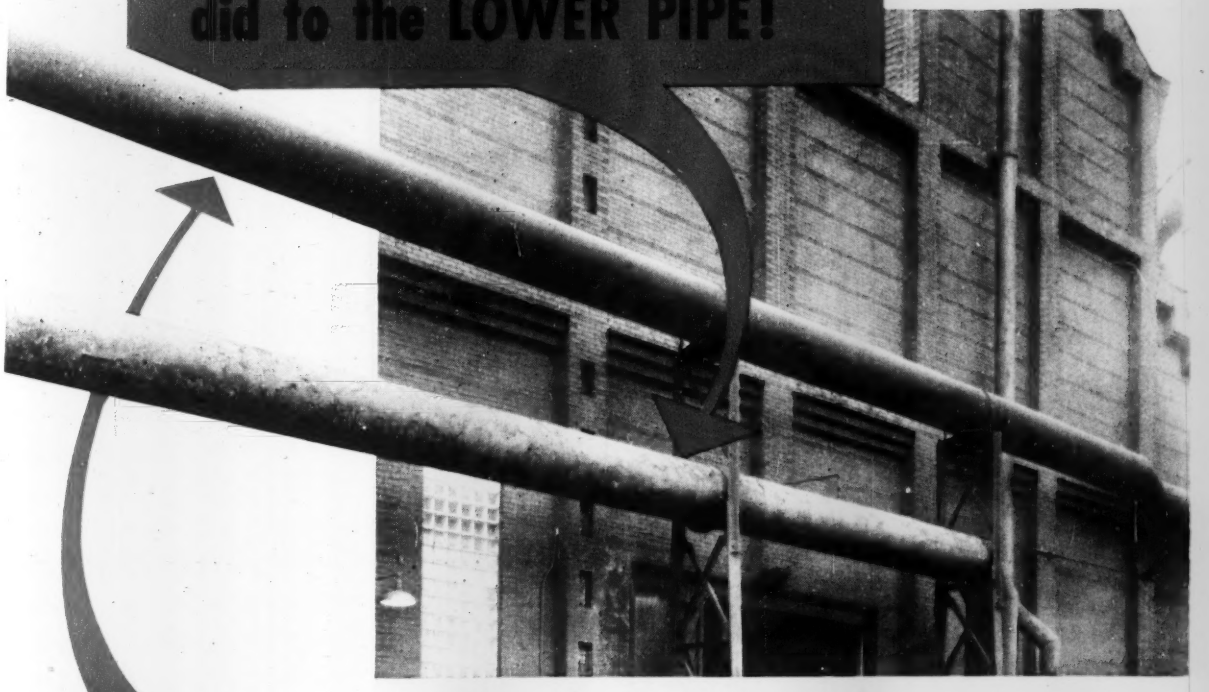
Look what coke quenching did to the LOWER PIPE!



THEN LOOK AT THE UPPER PIPE *completely protected* BY INSUL-MASTIC

The top pipe in this unretouched photograph has a three year old coating of INSUL-MASTIC, the *Superior* protective coating. The bottom pipe has been painted several times during those three years. These pipes are in a steel mill and both are constantly showered with acid vapors from a coke quenching tower which is around the corner of the building. So strong are the vapors that they sting the faces and arms of workmen, but three years of this punishment have not harmed the INSUL-MASTIC coated pipe.

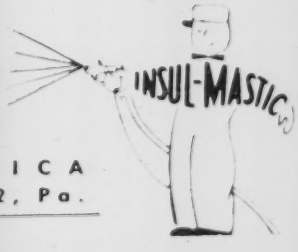
Steel mills throughout the country are learning that INSUL-MASTIC lasts for years and years and practically eliminates maintenance and replacement of metal equipment. These coatings are extremely resistant to acids, alkalis and moisture. They are specially made that way. The generous use of Gilsonite, one of nature's most chemically resistant minerals, helps give this lasting protection.

Save your tanks, structural steel, pipes, quench cars and everything on or near your coke batteries. Do as other mills are doing. Specify INSUL-MASTIC for coating this equipment.

*There is an INSUL-MASTIC representative near you. * * * Write for his name!*

Think First of the Coatings that last!

Insul-Mastic



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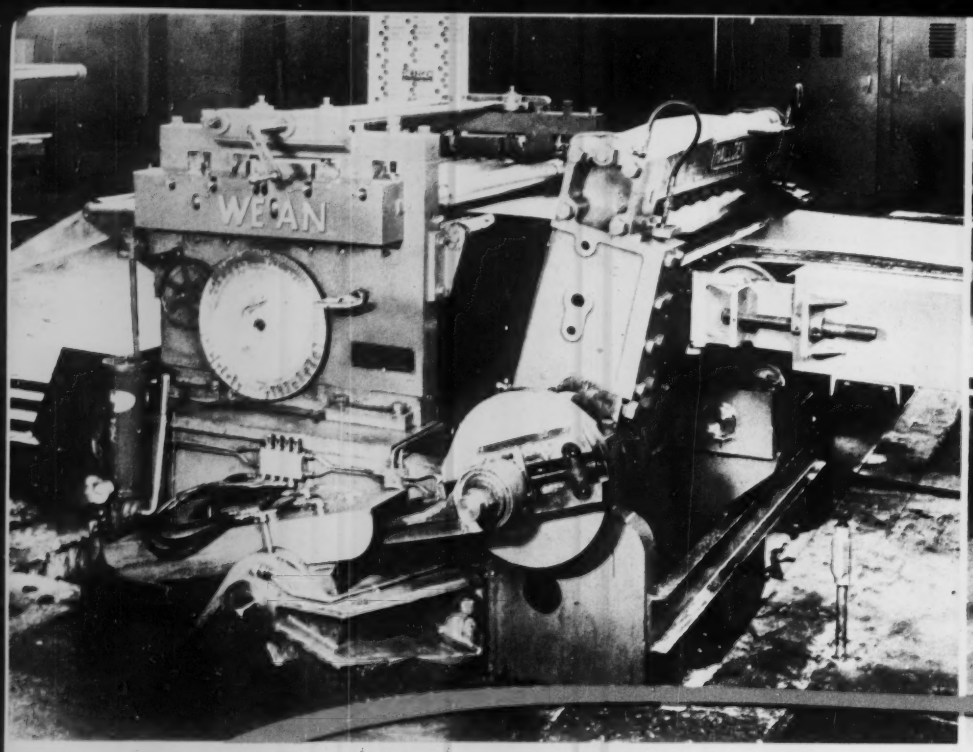
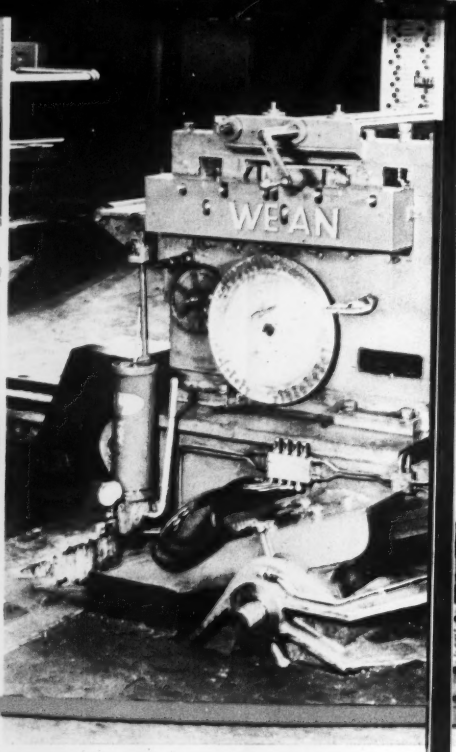
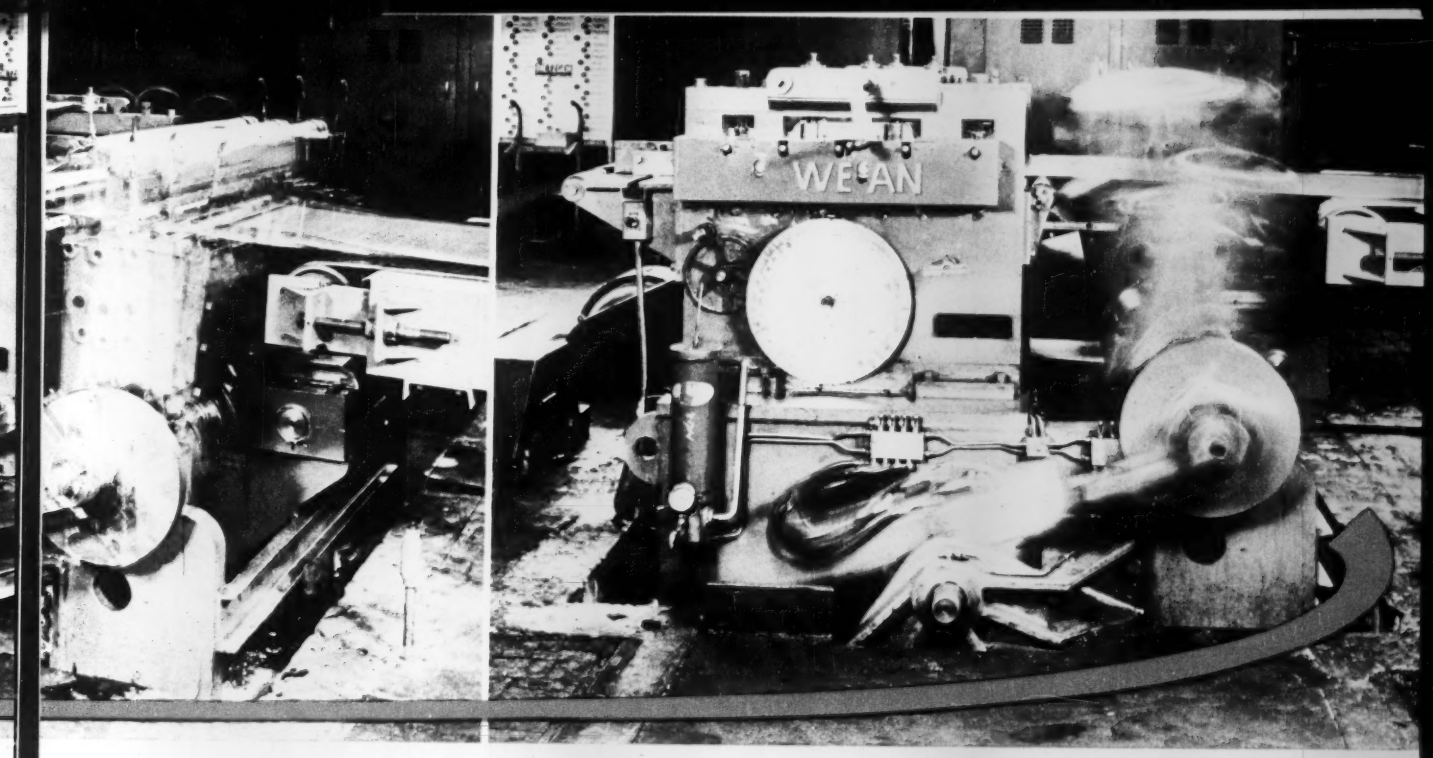




Here's the Amazing That Makes 100 Cuts Per Minute

Saves Bulk Steel Users $20 a Ton

Wean salesmen have a quick and painless method for actually showing you, using your own figures, how, by purchasing steel in coil form, you can save in the neighborhood of $20 per ton on your steel costs. This is an offer you can't afford to overlook. If your plant is situated in an area where a Wean Line is operating we invite you to see it in operation ... talk with the people who operate it ... and we're sure you'll want this great system in your own plant.



to Resquared Tolerance

One-hundred cuts per minute to resquared tolerances . . . that's what users of the amazing new Wean Equipment Flying Shear and Slitting System are getting. That's why, if you are using steel in sheet form, it's important to you to get all the facts.

By purchasing steel in coil form you eliminate all the expensive mill extras that sometimes amount to more than $1.00 per hundred weight. You reduce considerably both the personnel required to handle and inventory large steel stocks and the space needed to store various cut sizes of steel of the same gauge and analysis.

And this Wean System provides you with faster production. Here is a shear line that will cut to tolerance at the rate of 100 times per minute. Measure this against your present squaring-to-multiples rate and you'll quickly see how a single Wean line can keep a bank of high speed presses in constant operation.

NOW! THESE SAVINGS ARE EVEN MORE IMPORTANT

Rising costs are forcing steel makers to further increase the cost of extras. Some of these raises are already in effect. In the face of such action the Wean slitting and shearing line should now be even more important to you.

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Mark of Distinction

Wean

COMBINATION SLITTING and SHEARING SYSTEMS

You?...

a Doubting Thomas?

IF YOU'RE a man who has to be shown, we're right in your corner. Just give Roebling "Blue Center" Steel Wire Rope one try . . . see for yourself how it saves time and costs you less on the job.

Two out of three wire rope users in the industrial field prefer Roebling rope. Call the nearest Roebling office for a Field Man to suggest the best ropes for your purposes.

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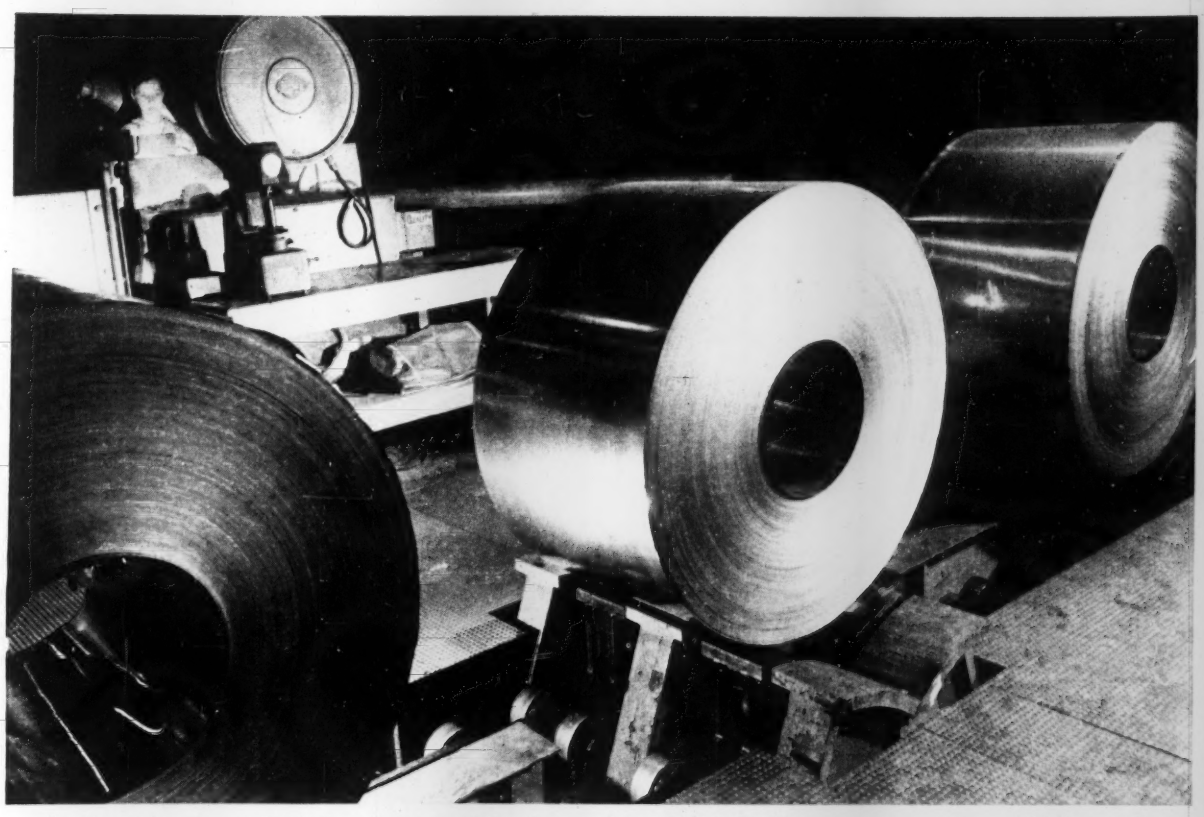
A subsidiary of The Colorado Fuel and Iron Corporation

JOHN A. ROEBLING'S SONS CORPORATION, TRENTON 2, N. J.



Precise weights of up to 40,000-lb. coils are recorded as they move along Link-Belt saddle top conveyor at temper mill delivery end.

Why Jones & Laughlin again selected LINK-BELT coil conveyors

Yield goes up . . . waste goes down handling 40,000 lb coils

HERE'S one mill that knows from experience how effectively Link-Belt conveyors cut coil handling costs. So pleased has Jones & Laughlin been with Link-Belt performance on their pickle line and five-stand tandem mill installed in 1948 that they again chose Link-Belt coil conveyors for their newest temper mills, cleaning and shearing lines.

In mills all over the country, Link-Belt conveying systems eliminate hours of lost time. Coils travel close together. They're handled gently, preventing edge damage. Down-time is reduced. Auxiliary devices transfer coils from one conveyor to another—turn, lower, tilt and weigh them with ease and precision. This increased mechanization means greater safety, reduced physical work for crews.

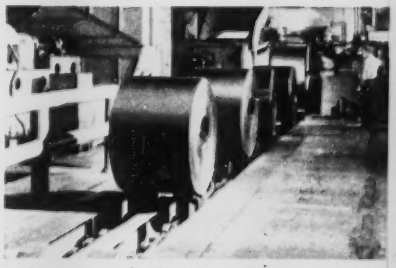
It pays to call in Link-Belt while expansion is still in the planning stage. The Link-Belt engineer—working with your own engineers, consultants and builders of mill and process equipment—can help you select the right conveying system for your exact needs.

13,262

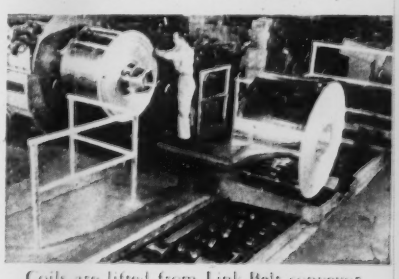
LINK-BELT

MATERIALS HANDLING, PROCESSING and POWER TRANSMISSION MACHINERY

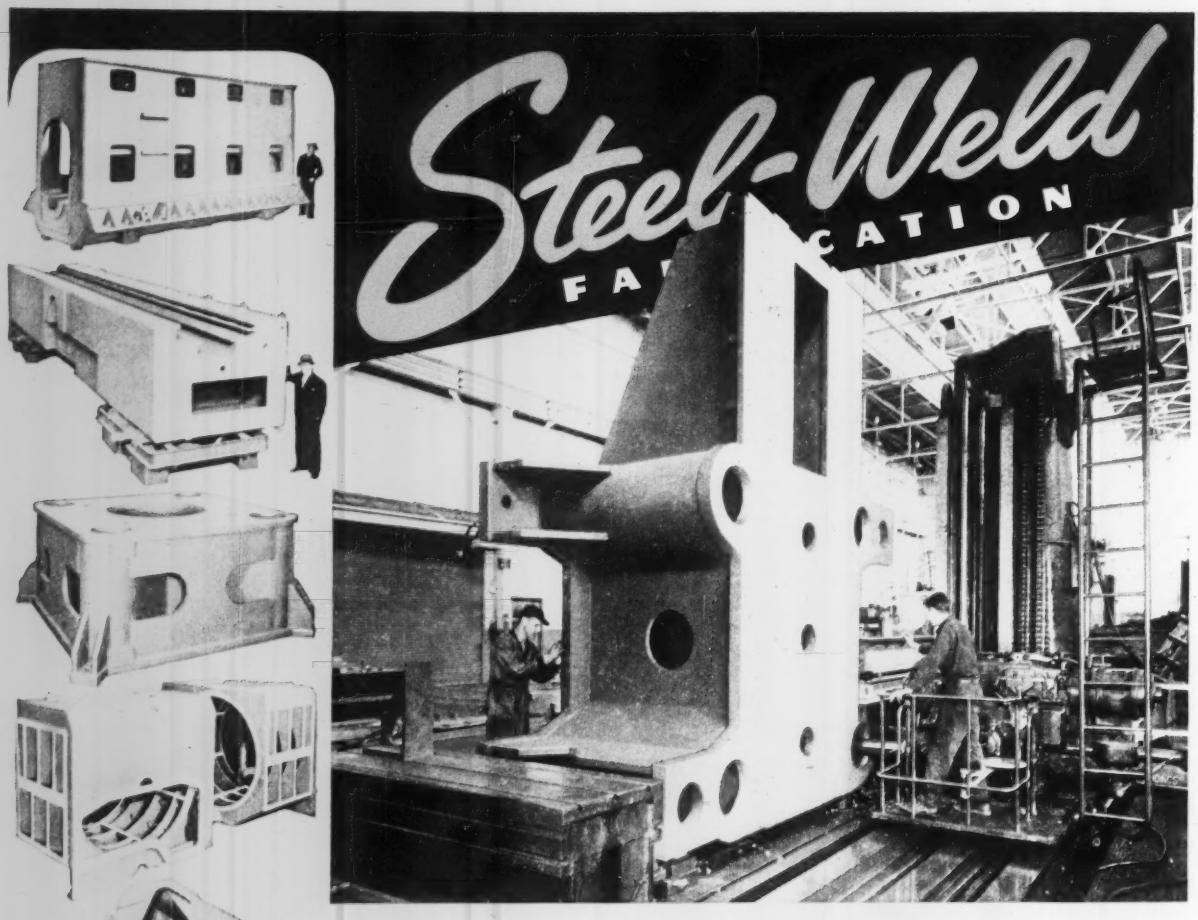
LINK-BELT COMPANY: Plants: Chicago, Indianapolis, Philadelphia, Colmar, Pa., Atlanta, Houston, Minneapolis, San Francisco, Los Angeles, Seattle, Scarboro, Ont. (Canada), Toronto (Canada), Elmira, Ont. (Canada), Springs (South Africa), Sydney (Australia). Sales Offices in Principal Cities.



At entry end of temper mill, coils are handled on 49 ft. Link-Belt Conveyor.



Coils are lifted from Link-Belt conveyor to pay-off reel by hydraulic buggy.



The forty ton Press Platen above, and the parts and assemblies illustrated at the left, are typical of thousands of Steel-Weld Fabricated units produced and machined by Mahon for hundreds of manufacturers of heavy machines and other mechanical equipment. If parts of your product could be redesigned and produced to better advantage through Steel-Weld Fabrication, or, if you require a limited number of large heavy pieces in which pattern costs are a consideration, you can turn to The R. C. Mahon Company with complete confidence . . . personnel and facilities are available within the Mahon plant to do the complete job from drawing board to finished machining. You will find in the Mahon organization a unique source with complete ultramodern fabricating, machining and handling facilities to cope with any type of work regardless of size or weight . . . a source where skillful designing and advanced fabricating technique are supplemented by craftsmanship which assures a smoother, finer appearing job embodying every advantage of Steel-Weld Fabrication. See Mahon's Insert in Sweet's Product Design File, or write for further information.

THE R. C. MAHON COMPANY

DETROIT 34, MICHIGAN

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looking for a wider selection?

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You can rely, too, on Crucible for the highest quality and uniformity in any of the hundreds of grades and types of special steels readily available to you. That's one reason we have been leaders in the production of these steels for 53 years.

For a wider selection of special steels—and fast, efficient warehouse service—call Crucible.

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These giants also contribute to the **JARECKI** reputation for making dies. Each die is tested on these presses before delivery to the customer.

Expanding facilities soon will make it possible for **JARECKI** "Giants" to serve new customers. A facilities booklet will be sent upon request.

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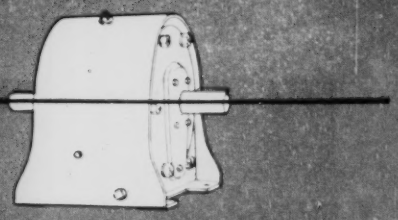
JARECKI MACHINE AND TOOL CO.

The versatile, STRAIGHT LINE



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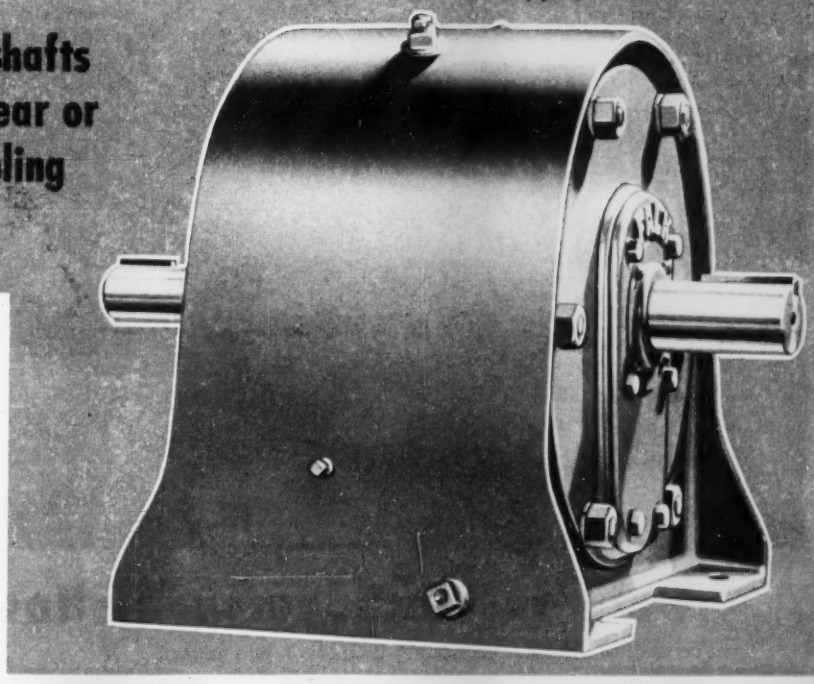
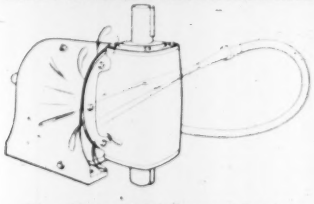
(Concentric Type)

High and low speed shafts suitable for V-belt, gear or chain as well as coupling connections





The Type "C" Speed Reducer has these "In-built" Factors:

Sealed Housings. Dual closures and one-way vents keep oil in, dust and moisture out. Units are splash-proof, leakproof, dust-proof.

Positive Lubrication. Large sump capacity . . . oil-tight construction assures clean lubricant . . . direct dip of revolving elements provides positive lubrication at all speeds.

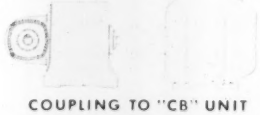
Precision Gearing. Heat treated alloy steel, precision cut and shaved helical gearing throughout . . . quiet-operating crown shaved pinions . . . taper bored gears for easy ratio changes.

Wide Speed Range. Selective ratio combinations provide output speeds from 1.5 rpm to 1430 rpm with stock gears.

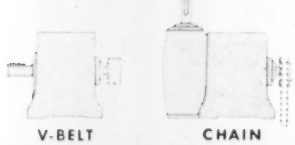
All-steel Housings. Unbreakable, strong, rigid. Generous overhung load capacities provided by wide bearing spans, large shafts and bearings.

Streamlined inside and outside. Smooth, clean surfaces; machine welded construction conforms to NEMA motor frames.

A FEW TYPICAL DRIVES FOR "C" AND "CB" UNITS



COUPLING TO "CB" UNIT



V-BELT TO "C" UNIT

CHAIN TO "CB" UNIT

Write for Bulletin 1104

The ideal type for Turbine, Engine or Special Motor

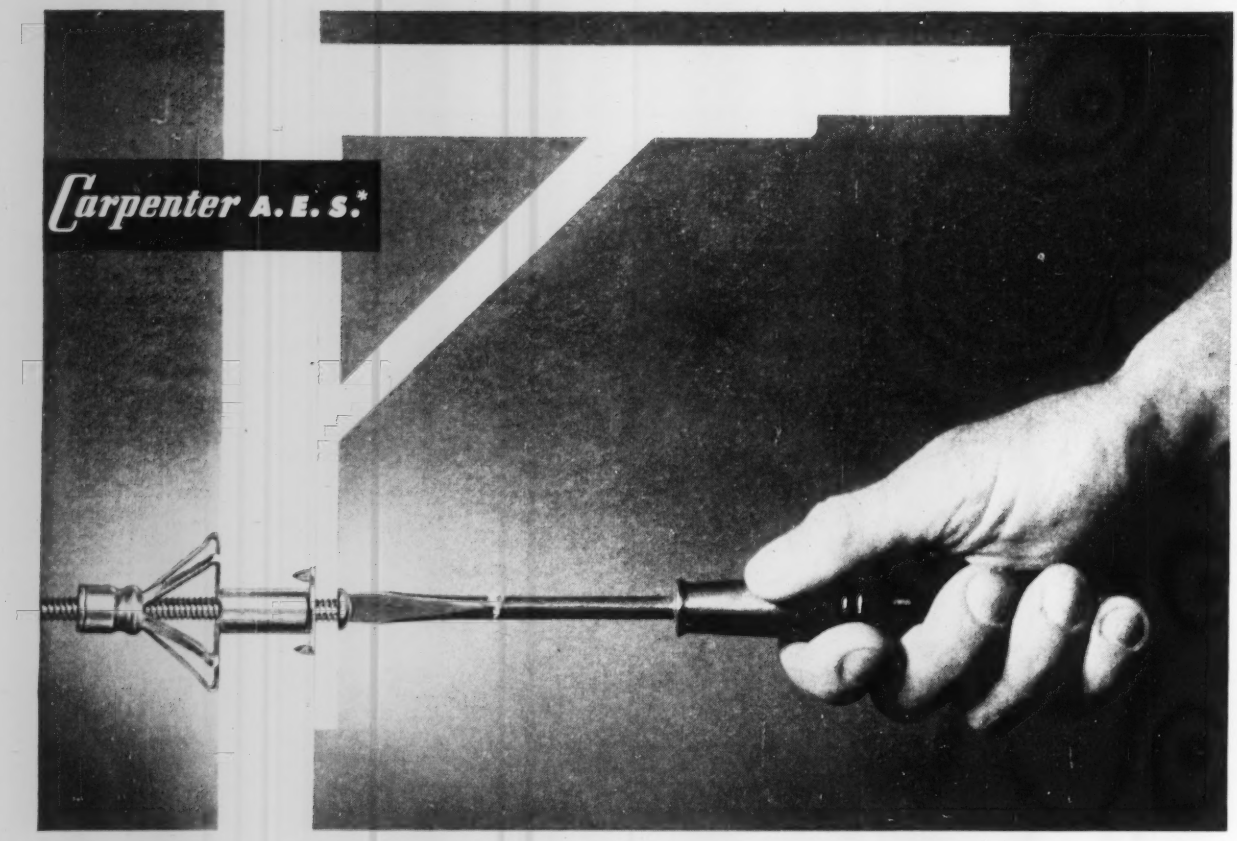
Here is an exceptionally versatile member of the famous FALK line of reduction units. The Type "C" Straight Line Speed Reducer is an all-steel concentric shaft unit rated in accordance with AGMA standards. It is structurally similar to the universally popular FALK Motoreducer, and offers many special application advantages.

It can be driven by motor, turbine or engine with direct coupling connection—or through a V-belt or chain drive. It lends itself effectively to hydraulic coupling, brake-wheel or overload protective coupling, multi-speed transmission, or to variable speed drives—without modification. Units can include self-contained backstop if desired. Ratio can be modified with easily installed stock gears. With modifications, unit can be used as a speed increaser.

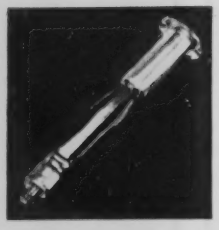
These all-steel Straight Line Speed Reducers are *available for prompt delivery* in standard ratios in horizontal and vertical concentric models, also in horizontal and vertical right-angle models; in single, double, triple and quadruple reduction. For full details, write for Bulletin 1104.

FALK . . . a good name in industry

THE FALK CORPORATION · 3001 W. Canal St. · Milwaukee 8, Wis.



Help for Handymen at Home



*Another example of how Carpenter *Application Engineering Service is helping industry cut costs.*

Ever try to turn a screw through plaster into a hollow wall? The result is usually disastrous . . . unless a device, such as this patented screw anchor, is used. With this anchor it's an easy matter to drill a hole, insert the device, then turn it tight. And it holds securely. But you'd be surprised at the production problems involved, even with a small item like this. For example, it's a highly competitive product turned out in huge quantities. This means that the tools and dies used to make it have to be just right—they have to hold sharpness, be accurate, provide adequate toughness, and hold up in the presses with no trouble while producing millions of parts.

To help control production costs, the manufacturer called on Carpenter Application Engineering Service for counsel in selecting die steels for the different sections of the progressive dies. A.E.S. supplied the answer—recommended five different steels in the Carpenter Matched Set . . . each engineered to perform its job best. Here, in the manufacturer's words, is the result: "With the help of Carpenter die steels we've been able to control our production costs so closely that there has been no price increase in the last five years!" (A detailed Field Report on the tooling for this job is available on request.)

Time and again, industry is finding new ways to hold costs in line and improve product sales with the help of Carpenter Application Engineering Service. A.E.S. is a service backed by almost 70 years of leadership in specialty steel development. It embraces trained Field Engineers, experienced representatives, competent Mill Metallurgists ready to work with you for best results. A.E.S. starts with your first call to Carpenter. THE CARPENTER STEEL COMPANY, 139 W. Bern St., Reading, Pa.

Carpenter

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Pioneering in Improved Tool, Alloy and Stainless Steels Through Continuing Research

CALENDAR
OF MEETINGS

December 29, American Association for the Advancement of Science: Panel discussion on visual performance and testing procedures. Bradford hotel, Boston. Panel chairman: Dr. N. Franklin Stump, Bausch & Lomb Optical Co., 635 St. Paul St., Rochester 2, N. Y.

January 5-7, American Road Builders' Association: Annual meeting. Chalfonte-Haddon Hall, Atlantic City, N. J. Association address: World Center Bldg., Washington 6. Secretary: Lt. Gen. Eugene Reybold.

January 11-13, Truck-Trailer Manufacturers Association Inc.: Annual meeting. Boca Raton hotel and club, Boca Raton, Fla. Association address: 1024 National Press Bldg., Washington 4. Managing director: John B. Hulse.

January 11-15, Society of Automotive Engineers Inc.: Annual meeting and engineering display. Hotels Sheraton-Cadillac and Statler, Detroit. Society address: 29 W. 39th St., New York 18. Secretary: John A. C. Warner.

January 11-16, Association of Steel Distributors: Annual meeting. Lord Tarleton hotel, Miami Beach, Fla. Association address: 29 Broadway, New York. General counsel: Morris Rosoff.

January 12-14, National Constructors Association: Annual meeting. Hotel Commodore, New York. Association address: 50 E. 41st St., New York. Secretary: C. B. Bronson.

January 13, American Boiler Manufacturers Association & Affiliated Industries: Winter meeting. Hotel Cleveland, Cleveland. Association address: 1571 W. 117th St., Cleveland 7. Secretary: A. C. Baker.

January 14-16, National Tool & Die Manufacturers Association: Board of trustees and committee meeting. Hotel di Lido, Miami Beach, Fla. Association address: 907 Public Square Bldg., Cleveland 13. Executive secretary: George S. Eaton.

January 17-19, Institute of Scrap Iron & Steel Inc.: Annual convention and exhibit. Hotel Statler, Washington. Institute address: 1729 H St. NW, Washington 6. Executive vice president: Edwin C. Barringer.

January 18-22, American Institute of Electrical Engineers: Winter general meeting. Statler hotel, New York. Institute address: 33 W. 39th St., New York 18. Secretary: H. H. Henline.

January 19-21, Caster & Floor Truck Manufacturers Association: Winter meeting. Hotel New Weston, New York. Association address: 27 E. Monroe, Chicago 3. Executive secretary: H. P. Dolan.

January 20, American Society of Body Engineers: Annual meeting. Detroit. Society address: 100 Farnsworth Ave., Detroit 2. Secretary: Edward Wachtlicki.

January 20-21, Steel Shipping Container Institute Inc.: Winter meeting. Hampshire house and Hotel Pierre, New York. Institute address: 600 Fifth Ave., New York 20. Secretary: L. R. Miller.

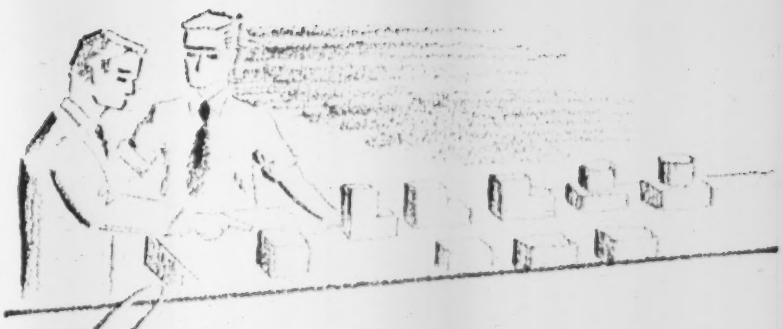
January 21, American Coke & Coal Chemical Institute: Western regional meeting. Drake hotel, Chicago. Institute address: 711 14th St. NW, Washington 5. President: Samuel Weiss.

January 21-22, Steel Plate Fabricators Association: Annual meeting. Palmer House, Chicago. Association address: 37 W. Van Buren St., Chicago 5. Secretary: J. Dwight Evans.

January 21-22, National Industrial Conference Board Inc.: General session for all associates. Hotel Astor, New York. Board address: 247 Park Ave., New York 17. Secretary: Herbert S. Briggs.

January 22, Malleable Founders' Society: Semi-annual meeting. Hotel Cleveland, Cleveland. Society address: 1500 Union Commerce Bldg., Cleveland 14. Managing director: Lowell D. Ryan.

January 25-26, Industrial Furnace Manufacturers Association Inc.: Annual meeting. Warwick hotel, Philadelphia. Association address: 412 Fifth St. NW, Washington. Secretary: T. F. Sheckels.



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The right kind of plant layout stems from an objective approach toward every phase of production. It helps to iron out all the production "kinks", reduce inventories, lower handling time, eliminate back-tracking, and assist in production control.

Pioneer has developed a thorough system of procedure in transferring the poor plant layout into one that reaps cost savings far beyond anything anticipated by the client. This procedure entails the preparation of process flow charts, taking into consideration such factors as methods, material handling, temporary and permanent storage, and inspection of materials. The flow chart is then transferred into a set of templets . . . or scale models . . . which is developed into a plant layout, allowing us to analyze the client's production from all angles.

We'll be glad to help show you how to cut production costs . . . with the right plant layout . . . tailored to meet your specific production needs! Send today for Bulletin 162-G on "How to Harness Your Production".

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STEEL
December 21, 1953

Metalworking Outlook

A Look at the Metals

As the year end approaches, here's a buyers'-eye look at the major metals: Steel—supplies are adequate for all but seamless tubing and wide-flange beams, prices are generally steady, although premium quotations are dropping; aluminum—supplies are adequate, solid demand will keep the price stable for the next few months; copper—the supply outlook is easy, but prices are uncertain; lead—European demand is a prop under the world price, and the current U.S. quotation appears steady for the near term; nickel—the metal is still fairly hard to get, and a modest price rise is possible; zinc—the supply is more than ample, but a brisk world market and domestic output cuts will keep prices steady.

DMS To Be Modified

You can expect less paperwork in connection with the Defense Materials System after the first of the year. The system itself, with its seven regulations and six orders, will remain intact; the changes will be aimed principally at eliminating reports now submitted by suppliers of materials for defense contracts and at reducing paperwork in Washington.

Rem-Cru Looks Ahead

Rem-Cru Titanium Inc., jointly owned by Remington Arms Co. Inc. and Crucible Steel Co. of America, will nearly triple its capacity for titanium production next year. Capacity is now 2500 tons a year and will go to 7000 tons in 1954. One reason for the increase, which is more than had been planned, is that E. I. du Pont de Nemours & Co. Inc., which supplies the raw material, has been able to ship more sponge, twice as much in December as expected. Rem-Cru is currently allocating 5 to 10 per cent of its production for commercial use, mostly in aircraft.

Failures: Sign of the Times

Watch those business failures. In every week but one since Sept. 1, failures this year have been running higher than a year ago, sometimes as much as 37 per cent more. In the week ended Nov. 19, failures climbed to 223, the highest level since January, 1950. Significance: The economy is shaking out, and it's tougher for a poorly managed firm to survive.

Railroads Train for a Fight

Last month southern territory rail rates on iron and steel products dropped 30 per cent. Rates on steel from northern to southern areas also were lowered. Other requests for similar rate cuts now pend before Interstate Commerce Commission. All this activity means that railroads are trying to recapture some of the steel haulage business they have lost to trucks. Rail rate cutting on iron and steel products will continue; watch for a far-reaching request for reduction to be placed before ICC early next year.

A Word to the Wise

Be on guard against a steel sales racket that has been worked in Cleveland, Youngstown and Detroit. Details vary from place to place, but generally

The Technical Outlook—p. 77 The Market Outlook—p. 121

Metalworking Outlook

this is what has been happening: XYZ Corp., a legitimate small or medium-sized steel distributor, is called on the phone by a man who says he's the purchasing agent for ABC Inc., a fairly well known company in the area. He orders some common product. A truck driver appears for it, but says that a last-minute switch means that the steel is to go to DEF Warehouse Inc., not direct to ABC. DEF, in the meantime, had been approached by a man with a plausible story about being forced to dispose of inventory. DEF agrees to buy at a low price. The trouble starts when ABC gets the bill from XYZ. It then develops that the driver presented fake papers to XYZ, that the man on the telephone was never heard of by ABC and that the man with the plausible story has disappeared.

Sky-High Housing?

Housing construction in 1954 would get a shot in the arm if the proposals made last week by the President's advisory committee on government housing policy get translated into action. But all the proposals are not likely to be implemented unless there's a strong threat of depression. As it looks now, 1954 will see nearly 1 million new housing starts without federal help. The committee recommends liberalizations of Federal Housing Administration mortgage insurance, including 40-year mortgages on low-cost homes; a lease-and-purchase plan to encourage the building of rental dwellings which tenants can eventually buy; continued public housing; liberalized repair loans.

Is Reform Needed?

Don't bet on any marked change in Taft-Hartley being voted in 1954, despite the millions of words being spoken and written about that measure. The President and Secretary of Labor James P. Mitchell have been strongly urging deliberation in recent speeches.

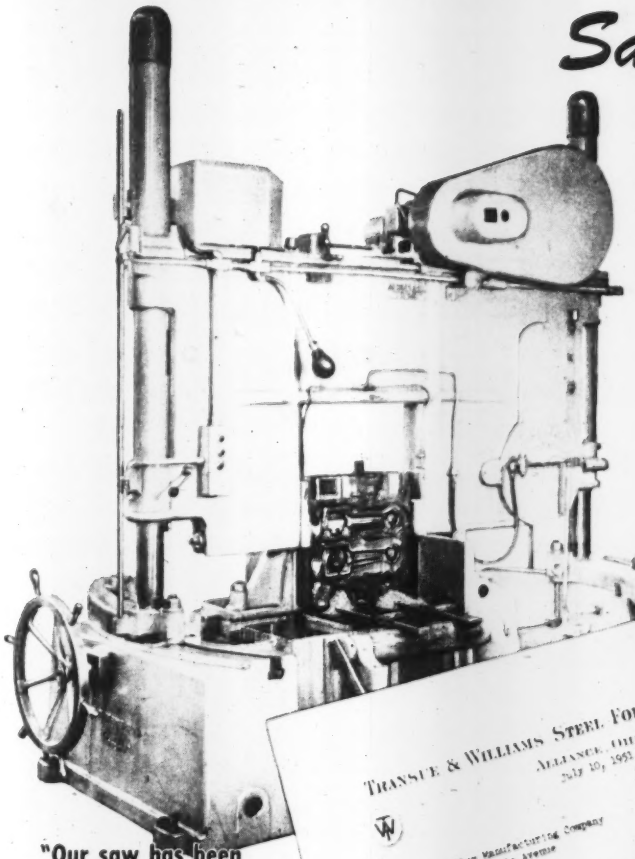
Straws in the Wind

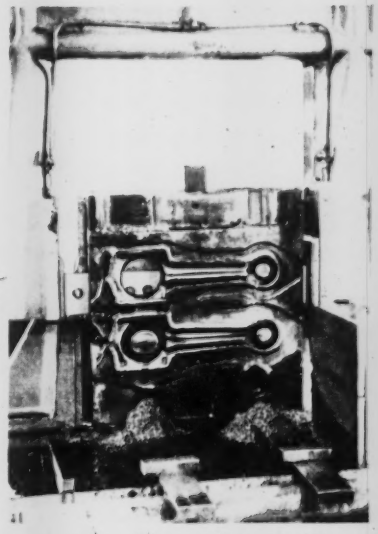
Defense Secretary Charles E. Wilson has ordered the military services to discontinue processing iron and steel scrap and other business activities which can be performed satisfactorily by private companies. . .Ford Division of Ford Motor Co. plans to make about as many cars in the first quarter next year as in its near-record third quarter of this year. . .The automotive industry maintained an average employment of 930,000 workers and its payroll reached $5.5 billion in 1953.

This Week in Metalworking

New plant and equipment expenditures may hit $26 billion in 1954, third highest in U. S. history (p. 37). . .The nation's capital equipment industry will do a $58-billion business this year (p. 38). . .Major appliance sales will drop only about 5 or 10 per cent in 1954 (p. 40). . .The Supreme Court says legislative clarification is needed on state vs. federal jurisdiction in cases of strikes and picketing (p. 42). . .The Renegotiation Board is swamped with more than 9000 pending cases (p. 43). . .Metalworking's economic pace will slow to about the lowest rate since 1949 as much of industry takes a long week end over the Christmas holiday (p. 47). . .The accent's on sales in Britain and West Germany (pp. 48-9).

Save 25% Time in Re-facing Dies... 20% Time -plus steel- in Shanking Them





Trimming the worn impression from the face of a 20" x 24" die block with a No. 24 MARVEL Universal Hydraulic Roll Stroke Hack Sawing Machine. Average Blade Cost $.0108 per square inch.

"Our saw has been in operation 2 years. Most of our sawing has been on die blocks..."

"We are removing the worn impression from the face of die blocks for re-inking . . . we recently removed 2 inches from face of blocks measuring 19" x 17" . . . sawing time 296 minutes for 2 blocks . . . Set up time 31 minutes . . . grinding time 155 minutes . . . total 8 hours and 2 minutes.

"Average time for removing same amount of stock from these die blocks with planer, 10 hours and 15 minutes. Sawing saves approximately 25% of time . . .

"With regard to removing excess stock to provide shanks . . . we remove approximately 90% of metal by sawing after which block is sent to planer for finishing. Time for sawing and planing is 20% less than planing alone.

"Pieces of stock removed by sawing are useful in many ways . . . saves buying of some trimmer steel."

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FOR EXAMPLE—if you stamp or brake-form uncomplicated, plain-finished parts like supports, brackets, clamps, washers, fillers, liners, reinforcements, etc.—

THEN, the chances are better than even that you can reduce your material costs.

(1) by switching from "Tiffany" steels to more economical job-fitted grades now available to serve your purpose equally well.

(2) by relaxing watchmaker gauge tolerances by mere thousandths and still satisfy the required function of your product.

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DEPENDABLE DAN
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Here's Dependable Dan with the behind-the-scene story about Reliance JOB-FITTING.

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. . . It's knowing your job . . . what you expect the steel to do for you.

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Slabs • Sheet Bars • Billets • Wire Rods
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DETROIT 9, MICHIGAN

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The New Managers

In his recent book *The Age of the Moguls* (Doubleday & Co. Inc.), Stewart H. Holbrook has written a fascinating study of the period when most of America's great fortunes were built. He recounts the exploits of famous men, including Carnegie, Rockefeller, Ford, DuPont, Morgan, Mellon, Frick, Schwab, Gates, Hill, McCormick and others, who were identified directly or indirectly with the metalworking industry.

Author Holbrook wisely does not pass judgment on the moral or legal aspects of the activities of these men individually, but he makes two general statements that have great significance.

The first is that the end result of the work of these moguls was timely and constructive. "I happen to believe," he writes, "that no matter how these men accumulated their fortunes, their total activities were of the greatest influence in bringing the United States to its present incomparable position in the world of business and industry."

The second has to do with changes in our national standards of business ethics. He says that the best of these men "made deals, bought immunity and did other things which in 1860, or 1880, or even 1900, were considered no more than 'smart' by their fellow Americans. . . . The rules have a way of changing every decade or so. . . . Indeed, under present-day rules, almost every man in this book would face a good hundred years in prison."

This is a shocking statement, yet it is absolutely true. The executive head of an enterprise today would not dream of doing things his predecessors of a half-century ago did as a matter of course. Why?

One reason is the increasing desire of the people to stamp out monopoly. This is reflected in our laws. Perhaps an even more important factor is found in the drastic changes that have occurred in the management of business.

Today the manager is hired for his skill. In the mauve decade he ruled because he owned. In the years ahead, the accomplishments of the managers who are hired for their ability will make a record that will far surpass anything that the tycoons were able to achieve by brute power of possession.

Merry Christmas!

E. C. Shaner

EDITOR-IN-CHIEF

BIG MEN APPROACHABLE: In the foreword of Stewart H. Holbrook's excellent book, *The Age of the Moguls*, is a statement by the author that of all of the 50 or more famous leaders mentioned in the book, Henry Clay Frick was "the hardest man to see."

We will not contradict this statement, but we will introduce the testimony of the late James

Mills, one-time district sales manager for Carnegie Steel Co., who in his early days was resident editor in Pittsburgh of *Iron Trade Review*, predecessor to STEEL. Mills was asked by his editor in Cleveland to interview Mr. Frick on a current situation involving beehive coke. Mills, a novice in editorial work, presented his card to the receptionist at Frick's office and much to his surprise was admitted immediately.

Frick said encouragingly, "You're new on the job?" Mills said, "Yes." Frick said that at this time of the day he relaxes for a half hour or so on a couch in an adjoining room. Would Mr. Mills permit him to recline on that couch and answer questions therefrom?

The cub readily agreed and from that strange interview came a wealth of information about the then pulsating beehive coke industry that only a master like Henry Clay Frick could divulge.

Frick may have been a "hard man to see" for many industrialists, but he was most gracious to our cub reporter.

IT'S NOT GOBBLING UP: In any discussion on the problems of small business versus big business, somebody is bound to come up with the question, "Why is it that today so many of the 'bigs' gobble up the 'smalls'?"

Recently this writer had this question hurled at him from a hundred or more junior executives of metalworking industries in one of the most important industrial centers of the nation. Before attempting to answer the challenging question, we asked the people in the audience to indicate by raised hands how many of them were employed by companies that were family-owned or owned by a very few stockholders. Much to the surprise of everybody, about a third of the people in the audience raised their hands.

This is very important. Many of these companies are going to seek wider distribution of ownership because of estate and tax considerations. It is not always as much the "gobbling up" process as it is the desire of owners to escape confiscating tax levies.

FOR MORE CAPACITY: From now on until the end of the year we are in the fortunate position of watching a lot of national statistics mainly for the purpose of seeing how much the record for 1953 will exceed that of previous years. In one of the important criterions of national accomplishment — namely steel ingot production — our steelworks output in 1953 by the end of last week totaled more than the production of any 52 weeks in any previous year.

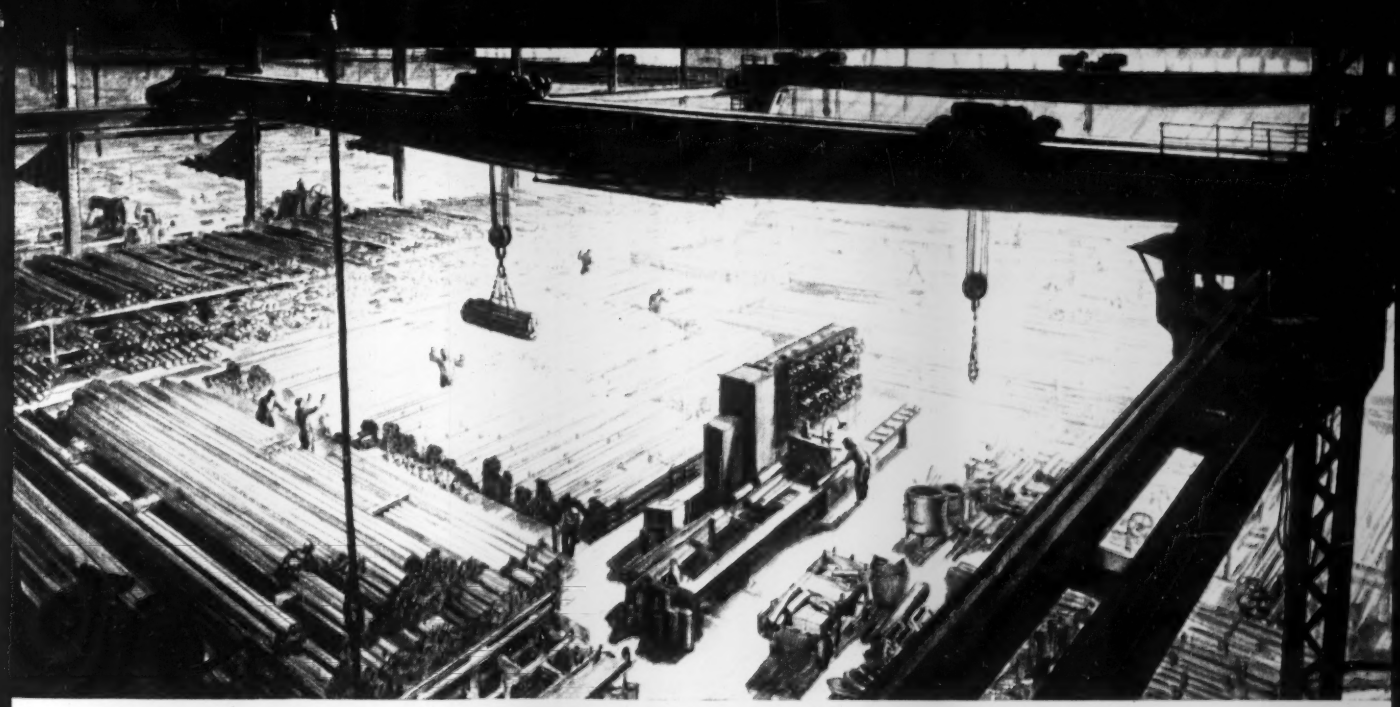
However, production is not the only criterion. Our capacity has increased tremendously. Significantly, the steel industry, instead of resting on past laurels, is contemplating additional increases in capacity. This is important!

REMARKABLE RECOVERY: Figures compiled by the National Industrial Conference Board show an interesting comparison of postwar gains in industrial production in six countries. On the basis of 1938 equaling 100, the index number for 1953 is 267 for the United States, 243 for Canada, 143 for France, 136 for the United Kingdom, 124 for Western Germany and 115 for Japan.

Whereas the United States, Canada, the United Kingdom and France enjoyed a high volume of industrial production from 1946 through 1953, Western Germany had an index of only 51 in 1948 and Japan of only 28 in 1946. Recovery in the defeated nations has been remarkable.

GOOD SIGN FOR 1954: Many economists place much weight upon the amount of money industry spends annually for new plant and equipment. They feel that liberal expenditures for this purpose go hand in hand with a healthy economic climate in which to do business.

If they are correct in this assumption then the business outlook for 1954 would seem to be pretty good. According to returns from over 5000 metalworking plants (p. 37), capital spending for new plant and equipment next year should total $26 billion, compared with a record $27.8 billion in 1953. This would make 1954 the third-best year in history from the standpoint of expansion and improvement of plant and equipment.



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SHEETS—Hot & cold rolled, many types & coatings

TUBING—Seamless & welded, mechanical & boiler tubes

ALLOYS—Hot rolled, cold finished, heat treated

STAINLESS—Allegheny bars, plates, sheets, tubes, etc.

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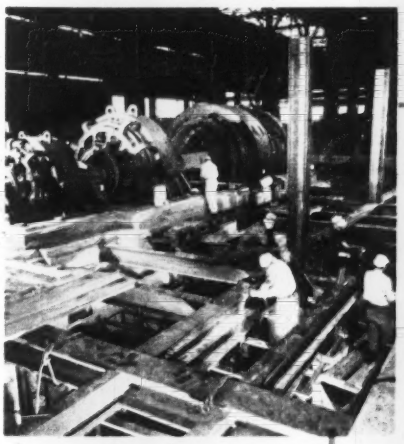


Pittsburgh Steel

NEW PLANT & EQUIPMENT EXPENDITURES*

	1952	1953	1954†
	(millions of dollars)		
Manufacturing	11994	12423	11312
Durable goods industries	5784	5858	5324
Nondurable goods industries	6210	6565	5988
Mining	880	891	856
Railroad	1391	1323	1116
Transportation, other than rail	1363	1363	1320
Public utilities	3838	4484	4048
Commercial and other	6989	7345	7312
TOTAL	26455	27829	25964

* Source: Securities & Exchange Commission † Estimated by STEEL

$26-Billion Expansion in 1954?

STEEL survey shows metalworking industry plans to boost capacity by 12 per cent next year. Fourth-quarter hike in capital spending reflects growing optimism for 1954

CAPITAL spending for new plant and equipment should hit $26 billion in 1954, making it the third highest expansion year in industry's history.

That's the conclusion reached after a STEEL survey of over 5000 metalworking plants. Metalworking executives say they expect to increase their plant capacity by an average of 12 per cent in 1954 over 1953.

Healthy Sign—Not only surprisingly high, that figure is significant of metalworking thinking. Spending this year at a record $27.8 billion (see table above) has been encouraged in large part by forced-draft measures — defense expansion, rapid tax write-off certificates and to a lesser degree the excess profits tax. Anticipated capital expenditures for 1954 (with those incentives far less dominant) are real votes of confidence for high-level business activity next year.

Optimism for 1954's prospects has been growing since last summer when the "10 per cent decliners" were making the most noise. Reflecting the increased optimism is the latest quarterly report of the Securities & Exchange Commission; all industry groups, except mining, anticipate greater capital expenditures in the fourth quarter than they estimated to the SEC last August.

Big Spenders—For all of 1953, manufacturers' additions to productive facilities will total about $12.4 billion, $400 million more than in 1952. Biggest spenders in this year's expansion were the chemical, petroleum and commercial industries and the utilities.

One encouraging factor in the SEC survey is that although the first quarter, 1954, capital-spending rate will be down somewhat from this quarter, it is considerably higher than the rate at which improvements were made in the first quarter this year—$6490 million compared with $6147 million.

Your Markets—Supplying much of the impetus in the high seasonally adjusted annual rate scheduled for next quarter are the commercial industries who anticipate spending some $1828 million. This category includes all the trade, service and construction industries which provide big markets for metalworking.

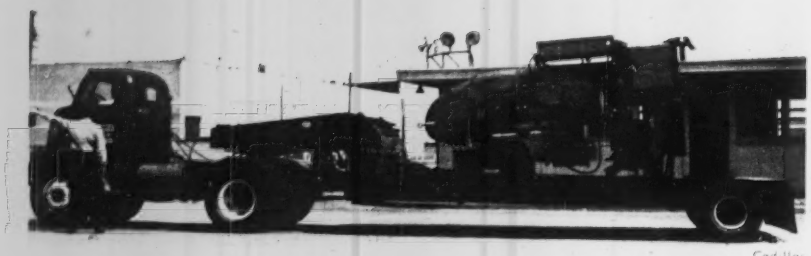
In metalworking, expansion in the primary iron and steel and nonferrous metal industries has peaked and is on the decline. But spending for new plant and equipment in the fabricated metal products, nonelectrical and electrical machinery industries will remain high in the first quarter.

Plus Sign — Coupled with the good business prospects for next year is another plus sign for high-level plant and equipment expansion next year the expected depreciation reform (see STEEL, Nov. 2, p. 79). Liberalization in the present depreciation laws will permit even more plants to modernize and build up the nation's productive capacity. A $26-billion expenditure for new plant and equipment in 1954 is definitely a possibility.

New Galvanizing Line Started

Wheeling Steel Corp. has placed into operation its new continuous galvanizing line for the production of zinc coatings at its Martins Ferry, O., plant. The line employs a patented process developed by Wheeling Steel research.

Officials say the top-rated speed of the line exceeds that of any continuous zinc-coating line in operation.



Cadillac

Private Purchases of Capitalized Productive Equipment, 1952

Product	Purchases (millions of dollars)	Percentage of Total
Furniture and fixtures (nonresidential)	$ 855	3.9
Fabricated metal products	360	1.6
Engines and turbines	268	1.2
Tractors	976	4.4
Agricultural machinery (except tractors)	1,161	5.3
Construction machinery	640	2.9
Mining and oil field machinery	792	3.6
Metalworking machinery (incl. machine tools)	1,197	5.4
Special industry machinery, n.e.c.	1,574	7.1
General industrial machinery	1,585	7.2
Office and store machinery	750	3.4
Service industry machines	926	4.2
Electrical machinery	2,865	13.0
Trucks, busses and trailers	2,466	11.2
Passenger cars (for business use)	3,309	15.0
Aircraft	167	.8
Ship and boat building	192	.9
Railroad equipment	935	4.2
Instruments	588	2.7
Miscellaneous equipment	440	2.0
Total producers' durable equipment	$22,046	100.0%

Source: U. S. Department of Commerce, Office of Business Economics

Capital Goods: A $58-Billion Impact

CAPITAL goods—their production, transportation, distribution and servicing—will have a $58-billion impact on the nation's economy this year.

That's the estimate of the Council for Technological Advancement of the Machinery & Allied Products Institute which has just completed a study of the capital goods productive activity for 1952 and an estimate for 1953.

Size—Last year this productive activity amounted to $54 billion, equal to 18.5 per cent of the nation's total industrial output. Some 8.1 million persons out of the country's 42-million nonagricultural workforce were employed in these activities.

Breakdown of this productive activity shows that $35 billion is accounted for by productive equipment, about $12 billion by capital construction and nearly $7 billion by maintenance and repair.

Equipment — Of the equipment total, some $22 billion represented sales to private industry which was capitalized by the purchaser. About $10 billion represented government and private purchases charged off to current expense. Exports totaled $3 billion. The difference between the $32 billion domestic figure and the $26.4 billion listed by the Securities & Exchange Commission (p. 37) is due to certain duplication with items getting on both "capitalized" and "expensed" lists and because CTA's figures include also equipment going for repairs and replacement of existing installations.

The volume of the purchases of each major category is shown in the table below. It is significant to note that no single group of commodities accounts for more than 15 per cent of the total. This range lends more support to the view that scheduled capital expenditures for next year (see p. 37) are a harbinger for high-level business activity.

More Uptrends — Major factors in the construction figure are industrial and commercial construction, public utilities work and oil and gas well drilling. The strong uptrend of public utility construction to match growing requirements of the nation's output and the current high-rate activity in the oil and gas industries promise to remain significant factors in the nation's investment structure.

Maintenance and repair expenditures are also vital. They are required year in and year out for the gross national stock of plant and equipment valued at $500 billion today. Continued expansion in industrial capacity means greater maintenance and repair outlays.

Employment Ratio — According to CTA's study, for every 1000 persons engaged in industries producing productive equipment, about 914 are employed in supplying and supporting industries, 277 in distributing the products to final users and 43 in transporting the finished goods.

CTA's study highlights the vast productive activity of the nation's capital goods and allied industries and the large employment these industries create. In such a keystone role, the capital goods industry serves as a bellwether for the nation's industrial pace.

Kitchen Cabinet Sales Up

Metalworking is capitalizing on the trend today toward making the kitchen the showplace of the modern home. Steel Kitchen Cabinet Manufacturers Association reports that its industry's 1953 volume should total about $178 million, 15 per cent over 1952.

According to SKCMA, there are about 50 companies in the field, about half of which account for 90 per cent of the volume.

MHI Outlook Optimistic

Replacements, emphasis on cost-cutting could help set new shipments record in 1954

GOOD BUSINESS is expected in 1954 by manufacturers of material handling equipment, even though shipments may fall short of the record set this year. That was the consensus of industry members attending the annual meeting of the Material Handling Institute in New York on Dec. 15. Shipments this year will hit the $1.5-billion mark, about 20 per cent over the 1952 figure.

However, some officials of the industry feel that 1954 business could readily expand to around $2-billion. That is based on the fact that over 25 per cent of the handling equipment now in use is obsolete or inadequate and that top management is realizing more and more that increased production and lowered costs can be obtained by over-all, integrated handling systems.

Metamorphosis — That is reflected in the change taking place in responsibility, the officials say. Only a few years ago, material handling was the part-time job of a busy production superintendent with limited access to top management. Increasingly, the material handling function is being exercised by a vice president with a voice in top-management decisions and power and responsibility to integrate material handling with accounting, purchasing, warehousing, plant layout, tool design and maintenance.

Builders of material handling equipment are not going to wait for business to come in, either. As a group and individually, they'll place more emphasis on advertising, promotion, clinics and shows. Next big national exposition is coming up in Chicago in 1956.

New Administration—Officers of the institute elected at the meeting are: President, Charles B. Elledge, manager, Materials Handling Industries Sales, General Electric Co., Schenectady, N. Y.; first vice president, Walter E. Shirmer, vice president, Clark Equipment Co., Buchanan, Mich.; second vice president, Edward W. McCaul, secretary and sales manager, Jervis B. Webb Co., Detroit.

Eight new directors are: Roland Whitehurst, Electric Storage Battery Co., Philadelphia; W. G. Reycroft, Bassick Co., Bridgeport, Conn.; D. H. Bitney, Union Steel Products Co., Albion, Mich.; R. L. Fairbank, Towmotor Corp., Cleveland; C. O. Hedner, Yale & Towne Mfg. Co., Philadelphia; Wayne O. Stoughton, Pittsburgh Steel Products Co., Pittsburgh; John W. Stiles, Island Equipment Corp., Long Island City, N. Y.; and George W. Raymond Jr., Raymond Corp., Greene, N. Y.

CHARLES B. ELLEDGE
. . . elected president of MHI

Steel Firms Get Certificates

Two steel companies received certificates of necessity for fast tax write-off in the latest listing released by Office of Defense Mobilization. U. S. Steel Corp. was granted certificates worth $8 million for facilities to make wide flange structural shapes in its Chicago area plants. One certificate for $1,430,000 allowed 65 per cent fast amortization; another for $6,570,000 allowed 50 per cent.

In addition, U. S. Steel received a $5,430,000 certificate for heavy steel plate facilities at its Munhall, Pa., plant, 50 per cent allowed for fast write-off. Allegheny Ludlum Steel Corp. was awarded a certificate for facilities to make grain-oriented steel sheet at its West Leechburg, Pa., plant.

Price Predicts Good Year

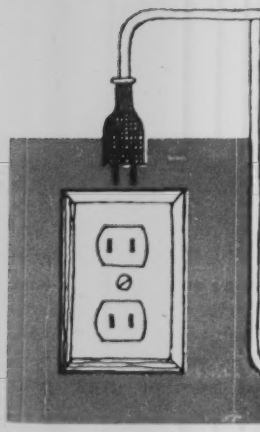
Westinghouse president expects company's sales in 1954 to top this year's peak

"INDUSTRY can anticipate a 'good' year in 1954 even in comparison to high-level postwar performance and a 'fabulous' year in terms of prewar achievement," said Gwilym A. Price, president, Westinghouse Electric Corp., Pittsburgh, in his year end statement in which he predicted another peak year ahead for his firm.

Mr. Price said 1954 will see Westinghouse surpass the anticipated record sales of approximately $1.6 billion set this year because of the over-all growth in the electrical industry and the company's expanded facilities. That is based on the prospect of a record sale of 386 million kilowatts of electrical energy next year and continued record sales through 1967 and the subsequent demand for generating equipment. In addition, the company plans to improve its position in the appliance field through increased manufacturing capacity, broadened lines and expanded distribution facilities. Defense shipments will also increase in 1954, Mr. Price stated.

Biggest Yet—To date, 1953 "may well be classed the 'big' year," the Westinghouse president said. In addition to the large sales, the electrical firm spent a record $75 million on research and development. A substantial portion of the current $296-million expansion program is being devoted to research and new-development facilities. Approximately $190 million of the expansion money has been spent, with the bulk of the rest of it scheduled for use in 1954. The total program will be completed in 1955.

Despite the optimistic outlook for 1954, Mr. Price is sure that business will face many major problems. "Some of these, like high taxes, are not new, although the prospect of some relief is," he said. Others he pointed out are: Tough competition; integration of expanded production facilities through better distribution and sales programs; new product development and production; and production of defense equipment.



OUTLOOK FOR MAJOR APPLIANCES

Manufacturers' Unit Sales

APPLIANCE	Best Year Before 1953	1952	1953	1954
Electric refrigerators	5,848,579—1950	3,413,602	3,700,000	3,500,000
Electric ranges	1,830,000—1950	1,060,000	1,400,000	1,250,000
Gas ranges	3,023,000—1950	2,175,400	2,275,000	2,400,000
Household washers	4,289,931—1950	3,101,045	3,750,000	3,700,000
Dryers	614,677—1952	614,677	675,000	725,000
Home freezers	814,086—1952	814,086	1,100,000	1,080,000
TV receivers	7,463,800—1950	6,096,279	7,200,000	6,000,000
Home and portable radios	9,849,300—1950	6,982,166	8,000,000	6,500,000
Room air conditioners	350,000—1952	350,000	950,000	1,000,000

Sources: STEEL estimates and manufacturers' associations.

Major Appliance Outlook for 1954: The Customer's Back at the Switch

By ARTHUR W. ZIMMERMAN
Assistant Editor

MAJOR APPLIANCE manufacturers are planning on one of their best postwar sales years in 1954.

Manufacturers' unit sales are expected to be off from 5 to perhaps 10 per cent on some items (see the chart). But that will mean 6 out of the 9 appliances shown above will still equal or better factory shipments of a majority of post-World War II years. The dip represents inventory adjustments on the manufacturers' level for the most part. Manufacturers expect total dollar sales to remain about the same in 1954 as this year. High costs rule out any significant price reductions; creeping price increases and added sales of growth appliances will offset dip in unit sales of others.

Down to Cases—Manufacturers are not regarding the 5 to 10 per cent drop in major appliance unit sales as inevitable, either. To a large extent, appliance makers say, next year's results depend on how well the industry remembers its prewar techniques of hard selling. With materials and production facilities freely available, the number of appliances built will depend directly on the number which can be sold.

This is the way manufacturers see the sales outlooks for major appliances in 1954:

Refrigerators—Since the refrigerator is regarded as one of the most basic home appliances (saturation is better than 90 per cent), this appliance is expected to maintain postwar level of sales of between 3.5 and 4 million units. Average price per unit (dividing total dollar sales by number of manufacturers' unit shipments) may rise slightly next year as the trend is definitely toward larger units.

Ranges—Another stable appliance, the range is expected to maintain its 1-million-plus sales for electric units and gain slightly for gas units as gas mains are extended to new housing developments. Sales softened toward the end of 1953. Range design will get more attention in 1954. Trend is toward more compact units, faster cooking units, inclusion of small housewares, such as deep fat fryers, as integral parts of the range and custom-built ranges.

Washers—Though saturation of washers of all types is about 75 per cent, saturation of automatics is less than 20 per cent. Automatic washers are one of the strong appliances on the sales floor and are credited with keeping over-all washer sales high. Consumers are willing to accept a shorter life on washers than on most other appliances. Postwar wringer washers are being traded in on automatics in large numbers. Sales will be about the same next year as this, thanks to the continued trend toward automatics.

Dryers—Definitely a growth appliance, dryers have not yet reached their peak annual output. Saturation is still less than 10 per cent. Turn to a buyers' market will slow down growth, not stop it.

Home Freezers—Here's an appliance which has been unstable in sales performance. Merchandising gimmicks, such as food saver plans, gave sales a shot in the arm. But reaction set in when many of the food plan dealers went broke. Low saturation of less than 15 per cent gives makers hope that sales can be maintained at about the same level in 1954 as in late 1953 if accompanied with a good educational program on the proper use of home freezers.

TV Receivers — Outlook for manufacturers' shipments is for a downward trend. Part of the decrease will be inventory adjustments as TV distribution pipelines are full. One further brake on next year's sales: Possibility of color TV in the near future. But manufacturers say color sets for a while will cost $1000 or more and will also be scarce. TV makers believe there will be a lot more $200 customers around next year than customers willing to spend $400 or $500 for a TV set, so prices may slide. At least, more of the units on the lower end of the line will be built and sold.

Radios—Another stable appliance, radio refused to roll over and die when TV came on the

scene. Sales are expected to be strong on a replacement basis with about 85 million sets now in use and 900,000 family units coming into being next year. Growth of radio sales is hampered by hit-and-miss merchandising in favor of television.

Room Air Conditioners — Sales and shipments will be up again next year. It's the nearest thing to a boom market in appliances now. Growth will continue next year. Just how well manufacturers and distributors make out next year will depend to a large degree on the weather—hot, dry weather will tend to spur demand, keep prices up.

The appliance industry has come through two distinct selling periods since World War II and is entering the third in 1954: First came the lush sellers' market; then came the discounting and premium selling era when the public was taught to ask "What's your best price?" Now manufacturers are ready to try a new tack: "The 'slow' major appliance market can be overcome by a return to hard selling," says Thomas R. Chadwick, Thor Corp. general sales manager, after a national sales contest brought startlingly good results without price cutting. Appliance manufacturers chorus this one idea—1954 production and sales will be what the industry makes them, good or bad, through intensive and thorough selling practices.

How To Do It—To help distributors and dealers, several appliance manufacturers have instituted product training courses and refresher courses for distributor and dealer salesmen. There have been no cuts in advertising budgets reported to STEEL; raises in advertising and promotion activity are tentatively in the budgets of several companies, depending on early 1954 experience.

Product lines will get shorter. That's to help dealers concentrate selling effort and reduce the amount of money tied up in inventory. Dealers will not be encouraged to stock in depth, but instead to get a representative sampling of the manufacturer's complete line on the sales floor.

For Manufacturers — Product lines of manufacturers will continue to be diversified so as to give dealers the advantages of mixed carload shipments. Actually the trend to mixed carload shipments began years ago, but 1953 saw a great number of smaller companies jumping on the bandwagon. In 1954, at least one firm which does not have central manufacturing facilities will ship various appliances from scattered manufacturing plants to a central point and ship mixed carloads, with appropriate savings, to dealers.

Neither, Nor—Neither shortages in materials nor tool and die work will put any crimp on appliance output in 1954. Still radical design changes are not being made on a wholesale basis in major appliances—at least not in the beginning of 1954. They will come later if the market sags more than expected.

Quality is the key word for 1954 models. Some manufacturers are going from plastics to steel "not because plastics won't perform adequately, but because steel looks like quality to the consumer."

More Confidence—As the 1953 selling season draws to a close, manufacturers are gaining confidence that the 5 to 10 per cent dip in their unit sales expected next year doesn't have to be so. For example, John T. Ashbaugh, Westinghouse Electric Corp.'s vice president, Electric Appliance Division, said in late November, "I sincerely believe that sales of electric appliances in 1954 will be considerably higher than sales of 1953, which has been a very good year."

It may just be self-hypnosis, but appliance makers now are beginning to believe hard selling and tighter distribution will maintain sales at high levels in 1954.

What Appliance Manufacturers Say About 1954

JOHN C. SHARP, president, Hotpoint Co.:
"Although there have been mixed predictions about a possible business recession in 1954, Hotpoint believes the economy will continue its growth . . . Our budgeted sales for 1954 are slightly ahead of those for 1953, which was an excellent year."

JAMES F. DONNELLY, vice president in charge of sales, Servel Inc.:
"Servel is most optimistic on all appliance fronts for 1954 and looks for a very good year. However, merchandise will have to be *sold* in 1954, and Servel plans to put the full force of top-notch selling and promotion behind each product line."

CHARLES T. LAWSON, vice president, Nash-Kelvinator Corp., in charge of appliance distribution:
"The upward pressure of costs in the appliance industry as a whole continues firm; yet retail experiences of the past year indicate rather clearly that increased costs cannot be passed on to the consumer. This means that in order to sell at a profit, manufacturers must find methods of improved economy."

H. F. LEHMAN, general sales manager, Frigidaire Division, General Motors Corp.:
"Speaking for the Frigidaire organization and the appliance industry as a whole, we expect 1954 sales to be somewhat comparable to 1953. This can be achieved by maintaining sales through improved salesmanship."

RALPH J. CORDINER, president, General Electric Co.:
"We see nothing in the business picture to justify the fears of a recession which are being expressed in so many quarters today. We see no reason why consumer durables cannot continue to maintain a good volume with proper selling effort at all levels."

NEA

Who has jurisdiction in picketing, strikes? Supreme Court says . . .

Boundary Needed Between State, U.S. Labor Powers

WATCH FOR a renewed drive in the next session of Congress to give the states precedence over the federal law in handling strikes and picketing.

Impetus for such action stems from a decision by the Supreme Court that state tribunals lack authority to intervene in labor dispute issues falling within the jurisdiction of the National Labor Relations Board under the Taft-Hartley Act.

Fuzzy—Need for clarifying legislation was indicated by Justice Robert Jackson in writing the opinion that was unanimously adopted by the court. The federal labor law, he said, "leaves much to the states, though Congress has refrained from telling us how much. We must spell out from conflicting indications of congressional will the area in which state action still is permissible."

The decision upheld a Pennsylvania Supreme Court ruling throwing out a Dauphin county, Pa., court injunction against a picket line around the Central Storage & Transfer Co., Harrisburg, in an organizing drive of the AFL teamsters' union. That the picket line cut the storage company's business by up to 95 per cent did not figure in the decision of either court, since the picketing was "orderly."

The Bill—Pending in the House and Senate is a bill H. R. 3055 by Rep. W. H. Lucas (Dem., Tex.) and S. 1161 by Sen. Barry Goldwater (Rep., Ariz.) aimed at curing the present weakness of allowing the NLRB jurisdiction over strikes and picketing while at the same time the board has no policing staff to enforce the federal law.

The bill would leave to the states all questions of determining union representation and membership, including the hot issue of compulsory union membership.

Despite Union Claims

"Unions have no appreciable effect on wages." Dr. Emerson P. Schmidt, director of economic research, United States Chamber of Commerce, thus sums up the results of a study on the need, insofar as progress of the working man is concerned, to strengthen the hand of union leaders by relaxing the Taft-Hartley Act.

Dr. Schmidt says that "in the last 20 years a period of fabulous union growth the share of national income going to labor, while shifting a bit from year to year, has not changed perceptibly. In 1936, for example, compensation of employees, according to Department of Commerce figures, was 66 per cent of our national income. In 1952, the figure was 66.3 per cent almost the same. Yet, during this period we have had the Wagner Act, minimum wage laws, political promotion of unions and a terrific amount of labor turmoil, strikes and threats of strikes and enmity.

"Market forces account for basic wage changes union and nonunion. A competitive free-market economy automatically passes into the hands of workers the gains of rising productivity."

Iron, Steel Payroll Climbs

Payroll for the iron and steel industry hit a new high in October, estimated at $290.5 million, American Iron & Steel Institute reports. October, 1952, payroll amounted to $282.8 million.

While the total payroll was up from September's $283.8 million, the average hourly rate of the wage earner was down, $2.307 compared with $2.328 in September. Wage earners averaged a 40.1-hour week in October, compared to 39.2 hours per week in the previous month.

Navy To Reduce Excess Stocks

"Operation Slimtrim," the Navy's new system for reducing excess and surplus materials in stock, shows that inventory of such materials at the end of September, 1953, totaled about $289.6-million. Surplus inventories increased $7.2 million during the month.

The inventories will be reviewed by top naval authorities, the other armed services and General Services Agency to see if the materials can be used by them. Materials unwanted by those agencies will be disposed of at public auction by Navy field activities.

Scrap Licensed for Export

Under the Bureau of Foreign Commerce's open-end licensing policy, 93,034 net tons of all grades of iron and steel scrap have been licensed up to Dec. 10 for fourth-quarter export. Commerce department reports that all but 3660 tons scheduled to go to Mexico is licensed for export to Japan.

For Defense: New Emphasis

Air Force, atomic weapons will get most of the defense money under the new budget proposal

EMPHASIS on the Air Force, atomic artillery and new weapons: That's to be the new defense policy if Congress O.K.'s Defense Secretary Charles E. Wilson's budget proposal for the fiscal year starting next July 1.

If your production capacity lies in the area where the increased defense emphasis will come, that means that your opportunity for defense work will be greater than ever. If your capacity for defense work lies in the other areas, that means your contract opportunities will decline moderately, but probably not sharply.

The Situation — The budget for fiscal 1955 proposes that $2 billion to $3 billion be lopped from the appropriation for the current fiscal year. But spending in fiscal 1955 is likely to remain about the same as in fiscal 1954 because of carryover funds from previous years.

An encouraging note for industry in the budget cut is that military manpower will be cut by about 10 per cent. This will provide an increase in the labor supply in the nation.

Striking Power—The long-range program for the Defense department as outlined by the Joint Chiefs of Staff calls for an Air Force of 137 combat wings, 127 of them by mid-1956. This means aircraft procurement will remain at high levels for probably another year or two.

President Eisenhower discussed the budget with congressional leaders over the week end. Even with the proposed cuts, officials say, the administration is going to have a tough job trying to make ends meet in 1955.

A Target—Over-all aim of the administration is to integrate the defense program into government spending so that national economic stability will be possible. Adm. Arthur W. Radford, chairman, Joint Chiefs of Staff, says that the joint chiefs are meshing their plans with the administration's economy drive to prevent defense spending beyond the nation's ability over the next 10 to 20 years. And within these limits, a balanced defense should be maintained — flexible enough to shift emphasis when the need arises and capable of winning a shooting war if it is ever forced upon us.

United Press

CHARLES E. WILSON
. . . cuts budget but not spending

Defense Pamphlets Available

Companies not familiar with the government's handling of defense contracts can get valuable information from these two new pamphlets: "How To Sell to the Department of Defense" and "Purchased Items and Purchasing Locations of the Department of Defense." Both are available from the Superintendent of Documents, Government Printing Office, Washington 25.

Appointments in Washington

Chosen deputy assistant secretary of defense for applications engineering is William H. Martin, who is retiring Dec. 31 as vice president, Bell Telephone Laboratories Inc.

Warren Webster Jr., president, Warren Webster & Co., Camden, N. J., has been named director of procurement and production policies under Charles S. Thomas, assistant secretary of defense for supply and logistics.

The general manager of J. F. Owens Machinery Co., Syracuse, N. Y., Joseph H. Owens Jr., has been selected acting deputy director, metalworking equipment division, Business & Defense Services Administration.

C. R. Burrell, vice president-sales, Tool Steel Gear & Pinion Co., Cincinnati, has been made director of the General Components Division, Business & Defense Services Adminstration.

A Long, Long Time

Delays in renegotiating defense contracts bring mounting complaints from industry

THE RENEGOTIATION BOARD is swamped.

The central unit, plus its regional boards, can process about 6000 cases of renegotiable defense business a year, but now pending are some 9200 cases. And more cases are flooding in because in April another 8000 or so filings are expected on renegotiable business in excess of $250,000 done in 1953. As the law now stands, a company's defense business showing receipts and accruals of less than $250,000 a year is exempt from renegotiation.

The Statistics—For 1951 the Renegotiation Board received about 24,400 filings on renegotiable business. Of those, some 9500 showed defense business above the statutory floor of $250,000. In 1952, about 23,600 filings were received, 10,100 of which were above the statutory floor. Thus far for 1953, 4300 filings have been received, 1700 of them above the limit.

Since the Renegotiation Act is certain to be extended beyond Jan. 1 (see STEEL, Dec. 7, p. 91), pressure is mounting from industry for a speed-up. As it looks now, the board expects to dispose of the bulk of 1951 cases early in 1954 and to clean up on most of the 1952 jobs by one year from now.

Rag Ends—But there will still be some 1951 and 1952 filings that won't be completely disposed of by the end of 1954. Those are the cases that involve special factors or where Renegotiation Board decisions are appealed to the U. S. Tax Court.

One automotive supplier who has renegotiable business puts it this way: "I have decisions pending before the Renegotiation Board on both 1951 and 1952 renegotiable business. Until I get those decisions, I can't know for sure my profits in those years. I've had to guess about those earnings, and if my guesses prove wrong, Lord help me." A machine tool man says: "Of all the objectionable aspects about renegotiation, this matter of the long delays is the worst."

By E. C. KREUTZBERG *Washington Editor*

United Press

U.S. Will Spend Freely In Case of a Recession

WHILE THE Republican administration and Republican leaders in Congress are not taking a chance on undermining business confidence by talking about antidepression medicine, this factor is an important one in their thinking for the future.

Take roadbuilding. That's of paramount importance when it becomes necessary to create more jobs. It is an axiom in the government that for every dollar spent directly on road construction, eight dollars immediately are spent indirectly. So most congressmen are averse to pulling the federal government out of the roadbuilding picture; that is the reason for the general disposition to reject the demand of the governors' conference that the federal government rescind its 2-cent tax on gasoline and leave gasoline taxing to the states. If that were done, one congressman told STEEL, the political pulling and hauling in the states would result in a crazy-quilt pattern hardly conducive toward planning a co-ordinated program for the nation. So Congress is expected to retain the

Caterpillar

federal tax, which brings in around $700 million a year, and hand over all this money and more to the states in allotments. The present federal highway aid of $575-million annually is to be increased, possibly to $900 million; the definite figure to be set will depend on the business trend at the time Congress acts.

Better Jobless Insurance . . .

Another antidepression weapon being hammered out is an improved unemployment insurance system. Part of the job is to be done by the Reed bill which passed the House and now is in the Senate Finance Committee. This would set up in the federal Treasury a $200-million fund for bailing out states that run out of unemployment insurance funds. It also would give to the states the difference between proceeds of the 3-per-cent payroll tax and the appropriations voted by Congress. This difference now is between $50 million and $60 million a year. Another proposal in the legislative mill would include under the unemployment compensation system employers of one or more instead of eight or more as at present. In addition, the administration will appeal to the states to increase their unemployment compensation rates and the period over which payments are made, and conform to a national pattern. Other ideas are being studied as, for example, one suggesting a moratorium, with government guarantees, on debts of workers thrown out of their jobs.

Higher Minimum Wage . . .

Another proposal which Congress will adopt next year is to increase the minimum rate of pay from 75 cents, with the aim of increasing the economic strength of millions of workers who still earn less than that rate. Labor leaders are calling for an increase to $1.25, but the expectation is for something around $1.

The same thinking surrounds the proposal to expand social security to many millions not now covered. The Ways & Means Committee will go to work early in January on a study to determine whether benefit payments should be increased and to set a higher amount which an older worker may earn and still receive his social security benefit.

More Federal Housing . . .

Of the same basic character is President Eisenhower's plan to submit to Congress in January a plan calling for construction of 1 million housing units in 1954. This would be accomplished through

Standard Oil Co. (N. J.)

liberalization of the federal mortgage insurance system so as to attract private investments under government guarantees. Still a moot point is whether the President will leave the whole program to private industry or whether he will include recommendations for a limited number of publicly-subsidized housing units. At any rate, the program is looked at as one calculated not only to provide better housing for more people but to provide millions of jobs.

Fairer Tax System . . .

The same type of thinking is reflected in current tax planning. Three ideas now under study would help business to provide more jobs. One is the elimination of double taxation of dividends; this would encourage investment of more private funds in business ventures. Another calls for liberalized depreciation policy, with special incentives for expansion in depressed areas. A third calls for liberalized treatment of research and development expenditures.

■ Tracer-light photo made with flashlights attached to fork tips, showing range of handling motions with the Baker "Octopus."

THE BAKER-RAULANG CO 1853 100th Anniversary 1953 THE BAKER-RAULANG CO

This BAKER TRUCK handles any shape load...

and stacks it in any position!

■ You name the load—the Baker "Octopus" illustrated will handle it, whether it's a drum, a roll of newsprint, a packing case, a piece of machinery, a bale of cotton or a pallet load of cartons. Moreover, it will pick it up, transport it, raise or lower it, shift it to left or right, revolve it, up-end it, or stack it in any position. In fact, it will handle it with no more physical effort than is needed to operate the simple hydraulic controls.

The "Octopus" consists of a standard Baker Fork Truck equipped with a variety of Baker attachments—360° revolving head, 4-purpose carriage, up-ender, drum clamp, etc.—which may be applied individually or in combinations. While one truck may never be called on to perform all these functions, the "Octopus" demonstrates the range of utility of Baker fork trucks and attachments.

write for *6-page special report on the application of Baker attachments to various loads.*

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industrial trucks

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BAKER-LULL Corporation, *Subsidiary*, Minneapolis, Minn.
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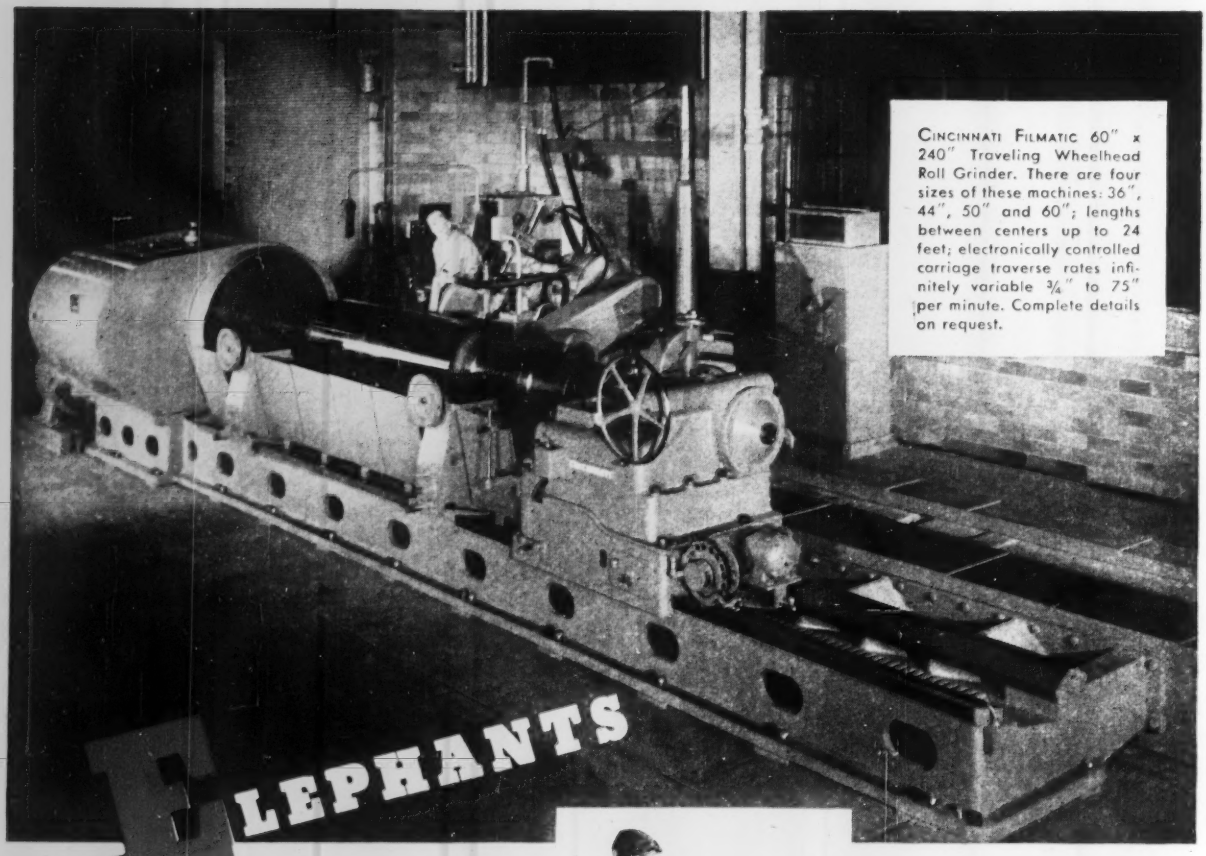

CINCINNATI FILMATIC 60" x 240" Traveling Wheelhead Roll Grinder. There are four sizes of these machines: 36", 44", 50" and 60"; lengths between centers up to 24 feet; electronically controlled carriage traverse rates infinitely variable ¾" to 75" per minute. Complete details on request.

ELEPHANTS and Rabbits

CINCINNATI

of precision grinding machines bear a familiar name plate

It takes long experience and extensive design and research facilities to build the elephants and rabbits of precision grinding. Cincinnati Grinders Incorporated have been doing it for over 25 years . . . they have the background and facilities for this type of work. Two examples of CINCINNATI FILMATIC Grinding Machines are illustrated here, a 60" x 240" Traveling Wheelhead Roll Grinder, weighing 149,500 pounds . . . about 45 times the weight of the No. 0 Centerless Grinder. Products ground by CINCINNATI FILMATIC centertype and centerless grinding machines range from surgical sutures .004" diameter, to steel rolls 60" diameter . . . 15,000 times as large and 665,000,000 times as heavy. Our engineering and shop facilities are at your service to equip your shop with any type of centertype, centerless, or special grinding machine for the lowest cost of production.

CINCINNATI FILMATIC No. 0 Centerless Grinding Machine. Catalog No. G-576-2.

Capacity: work diameter	0 to ½"
length, thrufeed	5"
infeed	4"
Grinding wheel	14"x4"x5" hole
Infinite regulating wheel speeds	35 to 320 rpm
Main drive	2 hp

FILMATIC

CINCINNATI

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CENTERLESS LAPPING MACHINES • MICRO-CENTRIC GRINDING MACHINES

CINCINNATI GRINDERS INCORPORATED
CINCINNATI 9, OHIO
(Subsidiary of The Cincinnati Milling Machine Co.)

Business Pace Slows for First Peacetime Christmas Since 1949

NOT A CREATURE will be stirring in most metalworking plants this Christmas, a STEEL survey shows. No wartime demands will force industry into overtime on the first peacetime yule since 1949.

Christmas queries indicate that 70 per cent of steel fabricators will close at mid-day Thursday, Dec. 24, with the majority remaining closed the following three days. Less pressure for most steel products makes that possible. Last year in Pittsburgh 55 per cent of companies interviewed by Tristate Industrial Association Inc. operated both shop and office the entire day following Christmas.

More Free Time—The ghost of Jacob Marley will not haunt management on Christmas Eve this year. Trend is toward a four-day week end in fabricating firms and three days free during Christmas week in basic steelmaking plants. The reason—a return to normal steel operations. STEEL's ingot rate compilations show national steelmaking operations at 85 per cent of capacity during the week ended Dec. 12, 1953. Operations for the similar week in 1951 were 104 per cent and in 1952, 105 per cent.

Large basic steelmakers will slow but not close operations on Christmas day, one of six paid holidays for the United Steelworkers of America. Weirton Steel Co., Weirton, W. Va., announces it will let off what men it can on Christmas, but work schedules will return to normal Saturday, Dec. 26.

Holiday — "Christmas and July Fourth are steelmakers' two traditional holidays during normal years," production men at Pittsburgh Steel Co., Pittsburgh, point out. "Where possible, workers will have the day off." Finishing mills will close down at other major production points while furnaces remain warm.

In certain nonferrous hot metal operations, production must remain constant at all times. Aluminum Co. of America says it is forced to keep its aluminum lines operating continuously, paying workers double time on Christmas day.

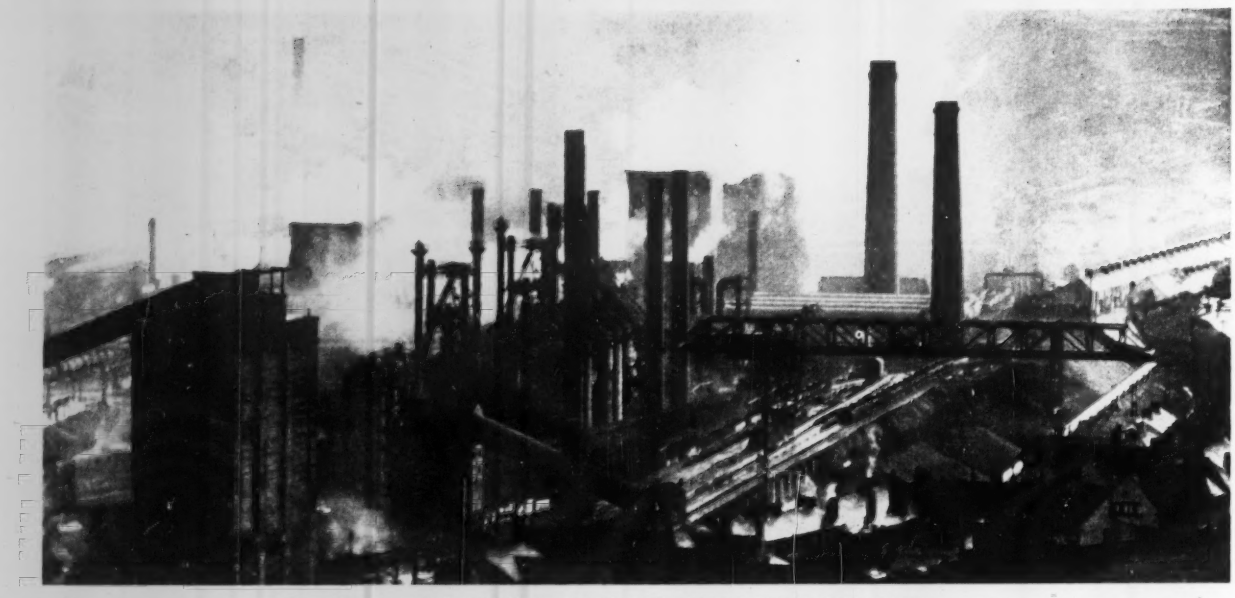
Cash for Christmas—Tiny Tim would be dismayed to learn that cash payments are replacing traditional Christmas observances at many plants. "We find that Christmas bonuses have become frequent practice in business," National Industrial Conference Board Inc., New York, reports. "In a recent survey 183 of 412 companies said they have some kind of Christmas bonus plan. Plans have no set pattern in industry."

Bonuses, once adopted, have staying power from year to year, NICB adds. No companies surveyed by STEEL plan to reduce or cancel bonus checks this year. Many of these firms offer bonuses to make up for fringe benefits paid by larger companies.

New Party Policy — Christmas celebrations may be less lavish than last year, a Michigan manufacturer warns, adding, "we can't afford a wild party." Associated Industries Inc., Cleveland, says the most popular parties now consist of liquorless gatherings of employees and their children. Executives act as hosts in morale-boosting parties at small plants or divisions of large companies.

Scrooge's spirit has not obscured traditional yuletide celebrations at most plants. "Many small companies here have open house the day before Christmas," comments Arthur B. Davies, executive director, Smaller Manufacturers Council, Pittsburgh.

Turkey Day—A venerable tradition is maintained by such companies as Cleveland Pneumatic Tool Co., Cleveland. Paul Black, director of industrial and public relations, declares his company's gifts of turkeys are well appreciated by the workforce— not to mention their wives and children.



EBBW VALE WORKS, RICHARD THOMAS & BALDWINS LTD.
. . . iron and steel output set new records in Britain

EUROPEAN METALWORKING LOOKS FOR PRICE-CONSCIOUS 1954

Record British steel output in 1953 spurred metalworking activity. Keeping prices competitive will be the big problem for 1954

ALONE among major Western European steel producing countries, Great Britain increased its output of steel in 1953 over that of 1952 about 19.6 million net tons compared with 18.4 million net tons setting a new all-time production record.

That fact gives the tip-off on Britain's strong comeback in world metalworking markets during the year. British metalworking industries, which had been handicapped by steel shortages for most of the post-World War II period, found supplies flowing to them in adequate volume this year.

Chain Reaction — These manufacturers in turn began to boost export sales. Metalworking exports constitute one-third of the industries' output and 40 per cent of total British export trade in 1953. That's compared with 25 per cent in 1938.

The automotive industry has been outstanding in the development of export trade. Between 1938 and 1950 the value of car and truck exports increased 14 times. Autos and trucks currently are accounting for some 12.5 per cent of total British exports, and automakers are seeking to expand even that volume. The U. S. has become Britain's largest market, taking more than $22.4-million worth of cars in the first half, 1953, compared with $15.2-million in first half, 1952.

Another metalworking field in which British producers have made extraordinary progress is agricultural machinery. Britons now claim they are the world's second largest producers and second largest exporters of farm tractors and machinery.

Last To Loosen — Last steel product to loosen up in supply was heavy plates, though even here unallocated supply in the second half allowed shipbuilders and railroad rolling stock producers to increase production. During the first nine months of 1953, 165 new merchant ships with a total tonnage of 857,000 gross tons were delivered.

Other facets of British metalworking are bettering last year's marks too. Machine tool output will maintain its rate of gain of the past three years with a total output of $203.5 million in 1953 against $173.6 million in 1952.

Problems Ahead—While improving steel supplies have enabled British manufacturers to forge ahead in certain metalworking markets, the gains have not been easy. For the first 10 months of 1953, for example, textile machinery exports were down about $5.6-million a month from the same months of 1952.

Keeping prices competitive is the big problem, say British manufacturers. Recent steel product price reductions to match those quoted by European Coal & Steel Community nations for third-country delivery demonstrate willingness of the British to sharpen their pricing pencils to remain competitive.

Red China—Another sign of the

freewheeling competition which is growing in Britain is the lifting of some trade embargoes on exports to China. Of $19.6 million worth of contracts brought from Peking, less than half have been sanctioned by the British Board of Trade. Four firms will be allowed, however, to ship $1,960,000 worth of air compressors and a quantity of small automobiles. Other contracts awaiting British government approval include those for $11.2-million worth of small generators, tool steels, simple machine tools and scientific instruments.

Compared with European steel producing nations, Britain fared very well in 1953, the year of swift change from a world steel shortage to a world steel surplus. British businessmen have served notice they intend to hold and increase their gains in 1954.

West Germany weathered the adjustments of 1953 very well, thanks mostly to a healthy export surplus in world trade

WEST GERMANY proved to have one of the most virile economies in Europe during 1953 and much of the credit must go to its world trade.

For the first time since World War II, Germany had a surplus of export trade of about $195 million in 1952. And in first half, 1953, the export surplus amounted to $197 million compared with $47.6 million in first half, 1952. That cemented Germany's position as one of the top three major trading nations with an export surplus, following the U. S. and Canada.

More Dollars — Added strength for the German economy came from reduction of deficit trade with the U. S. In the first half, 1952, the German dollar deficit amounted to $138.7 million. This year, first half, German imports from the U. S. exceeded German exports to the U. S. by only $32.8 million.

How has West Germany managed to do what most European nations find impossible to accomplish reduce imports and raise exports? The German automobile industry illustrates the answer.

The 80-per-cent-destroyed German automobile industry was almost completely rebuilt by 1948. Where production before the war had been concentrated in medium-sized cars, the small car got the nod in postwar output. Low purchase price and economical operation were made basic features. On that basis it has been possible for Germany to export about one-third of auto output.

Someone Loses—This blossoming of German auto exports necessarily cut into the markets of other car-exporting countries. In the Union of South Africa, for example, registrations of new German cars jumped from 24 units in 1949 to 4697 in 1952. United Kingdom gained also in that period from 19,607 units in 1949 to 24,970 in 1952. But the U. S. lost out, dropping from 34,141 in 1949 to 11,511 in 1952. Canadian new car registrations in the Union dropped from 11,268 in 1949 to 3130 in 1952, and French makes gained only slightly from 1567 in 1949 to 1764 in 1952.

Key to the German success in many underdeveloped markets is the willingness to trade on the customer's terms — in dollars, preferably; or a commonly agreed on currency; or barter; or, if all else fails, selling machinery to set up a domestic industry in the underdeveloped country.

Another Market — A case in point is the agricultural machinery market in Argentina where in previous years the U. S. and Canada had been leading suppliers. In 1952 nearly half of the import licenses issued by Argentina for agricultural machinery went to West German firms. In September, 1953, the head of the Argentine Institute for Agricultural Technology visited Germany to discuss a $30-million trade pact on this equipment (total Argentine imports of agricultural machinery in 1952 were $38 million). Part of the trade agreement provided for German assistance in Argentina's five-year plan to develop its own tractor and agricultural machinery industry. This agreement has not yet been signed.

Of course, Germany has not

Black Star

W. GERMANY: FABULOUS RECOVERY
. . . sizable export surplus for 1953

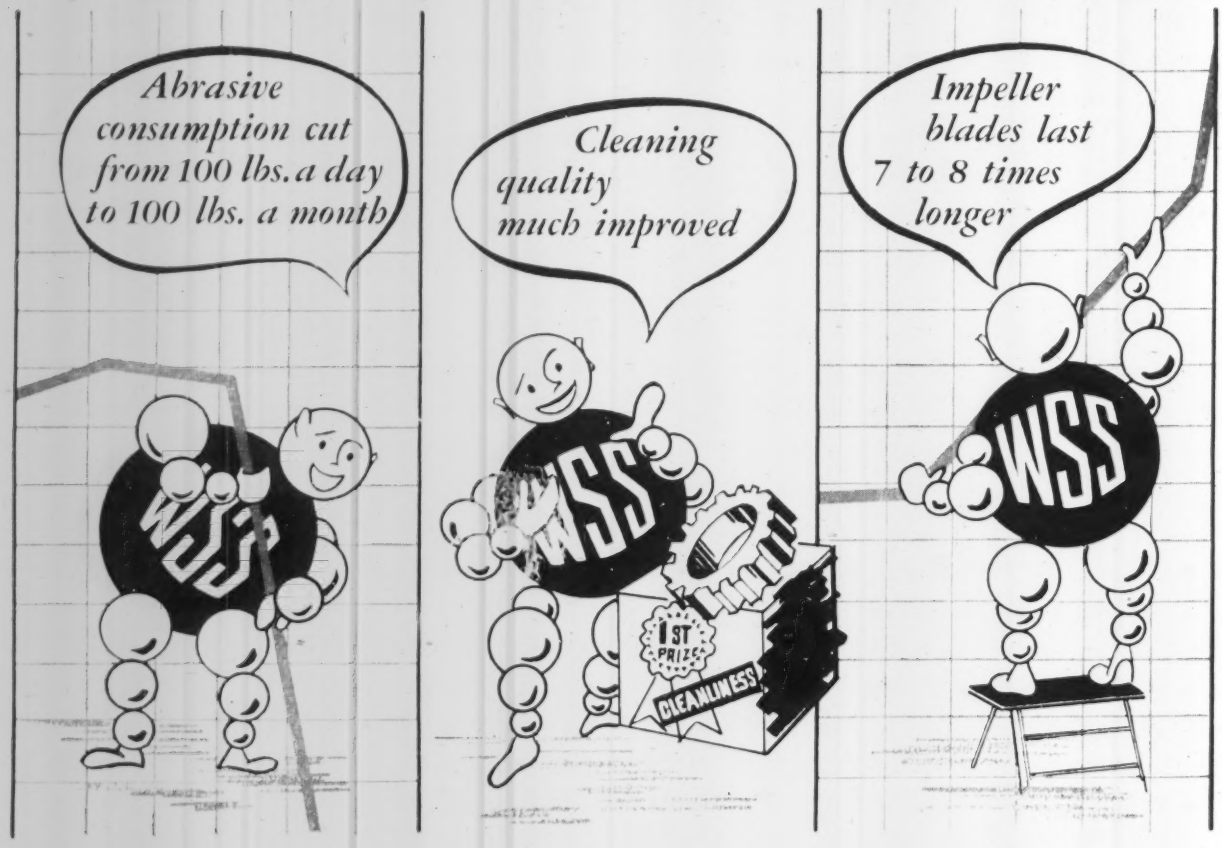
come through the adjustment period of 1953 unscathed. Steel output will be down from 17.4 million tons in 1952 to about 16.9 million tons in 1953. Where a total of 99 blast furnaces were in operation on Jan. 1, there were only 85 in operation on Nov. 1. Coal and coke, items of scarcity in 1951 and 1952, were piling up at alarming rates stocks were nearly 2.8 million tons in November, 1953.

Adjustments — But the adjustments being made in German metalworking industries amounted to little more than reductions to 5-day, 40-hour weeks. The steel industry was still operating at 80 per cent of capacity going into the fourth quarter.

What you can expect from German competition in 1954: More barter agreements and match-any-price selling. German manufacturers and steelmakers favor price cuts and German traders are willing as ever to do business on the customer's terms.

THESE are two more articles in a series on the economic presents and futures of the major European countries. On Dec. 7 we wrote about Italy and Sweden; on Dec. 14 about France and Belgium. Next week we conclude the series with a summary of the situation in Western Europe.

pioneering developments keep WHEELABRATOR STEEL SHOT *first in abrasives*



triple savings result from use of WHEELABRATOR STEEL SHOT

at the FATE-ROOT-HEATH COMPANY

Thirty times longer shot life, 8 times longer life for blast machine parts and much improved cleaning quality have resulted at the Fate-Root-Heath Company since they switched to Wheelabrator Steel Shot. Whereas they formerly added 100 to 200 pounds of chilled iron shot every *day* to the machine . . . they now add about 100 pounds a *month* of Wheelabrator Steel Shot.

In addition, wheel blades now last 4 to 5 weeks compared to only 3 days with the chilled shot.

The Wheelabrator Tumblast in which this superior shot is being used is operated 7 hours a day, five days a week cleaning gray iron castings weighing from ¼ lb. to 300 lbs. each.

Not only does the Wheelabrator Steel Shot last longer and reduce operating costs, it also does a much better job of cleaning. No castings are cleaned more than five minutes and most are cleaned in a three minute cycle.

"If steel shot cost twice as much as it does, it would still be the cheapest material to use," writes W. L. Chatfield, Foundry Supt.

Similar performance records in plants throughout the country on every type of product prove convincingly that the lowest overall cleaning costs are achieved with Wheelabrator Steel Shot.

Try it today and see.

"6 Steps to Greater Abrasive Savings"—a new 8-page Bulletin describes how your abrasive costs can be cut. Send for your copy today.

American
WHEELABRATOR & EQUIPMENT CORP.
509 S. Byrkit St., Mishawaka, Indiana

Wheelabrator STEEL SHOT

All We Want for Christmas

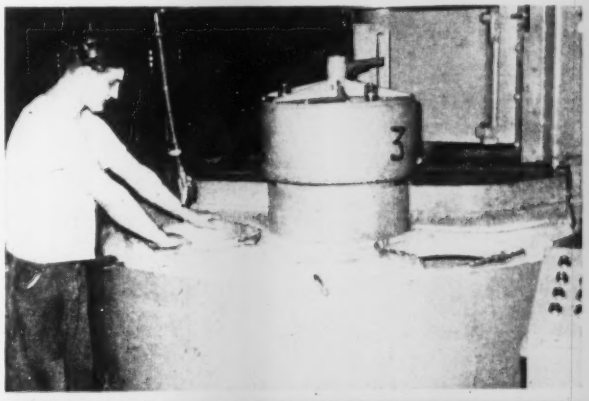
'Twas the night before Christmas
And on Santa's knee
Sat the wee independents
And robust Big Three.

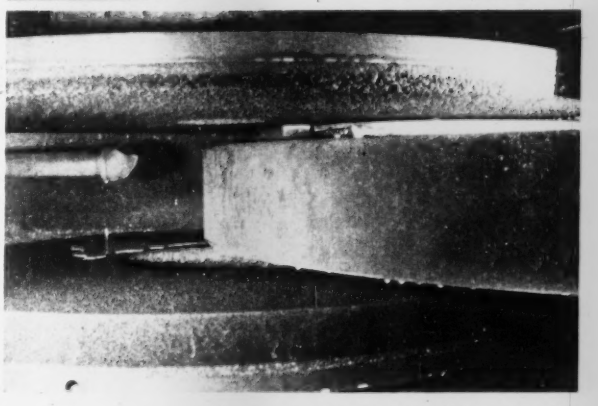
"I know that you all
Were good kiddies," he smiled,
"Though that second-half selling
Was certainly wild.

"But you made cars a-plenty
Throughout the whole year,
So whisper your wishes
In old Santa's ear.

"Would you like automation,
Some steel or some men,
A gas turbine engine,
Or nickel again?"

"Oh no, dearest Santa,"
They chorused with wails
"We'll handle production—
Just bring us some sales."





An operator puts the bell housing die-casting into the keeper fixture (top). Upper edge of the bell housing is just visible above the edge of the keeper between the grinding wheels (bottom)

DeSoto Tries the Hard Way; Makes Machining Job Look Easy

DETROIT

A TORQUE converter housing appears to be a relatively unexciting component, linking as it does the transmission with the engine block.

Yet should the two flat surfaces of the housing be more than a few thousandths out of parallel, many transmissions will set up a whine like a lonesome pup. When you couple this with the fact that a housing is about 20 inches in diameter, perhaps 9 inches from face to face and is irregularly shaped, you have a nifty clamping and machining problem.

New Approach—A safe method of doing this job is to machine the large surface of the housing, bolt the housing into position on the engine block and then locate from the main bearing lands to bore the transmission pilot hole and machine the rear housing surface. But DeSoto tackled the problem in a new way when the PowerFlite transmission housing came along. Not only is the housing completely machined before it is mounted on the engine, but it isn't clamped at all while the parallel flat mounting surfaces are being finished.

Key to the new technique is a semistandard Gardner No. 204 double vertical spindle grinder. The operator places the housing into a keeper-type fixture and then indexes the three-station carrier to place the part between the wheels (see above). The individual fixture then starts to rotate slowly while the carrier oscillates in and out. The lower wheel feeds up, lifting the part $\frac{1}{8}$ inch off the rest pads before it comes in contact with the upper wheel. The upper wheel is adjustable but does not feed down during the operation.

High Output—The upper wheel is 40 inches in diameter, the lower wheel 36 inches in diameter and they are of 36 and 24 grit respectively. Production is 80 parts an hour from the one machine with one operator.

Owing to the heat generated by the large surface in contact with the grinding wheels, warpage of the part could be a problem at one thin point of the diecasting. Gushing soluble oil and water coolant

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have been found adequate to dissipate the heat, however, and the warpage is prevented. The wheels are dressed by the part itself and advanced a few thousandths after each 10 to 15 pieces. A wheel one inch thick lasts three to four weeks and produces 8000-10,000 parts, based on the four months the machine has been in operation.

Progress—A Michigan drill-head five-station transfer machine then takes over. Following loading against a limit switch at the first station, the machine core drills seven tap holes, two dowel holes and reams two location holes. At station three the two dowel holes are reamed and the transmission pilot hole is rough and finish bored by a special DeVlieg boring head which has two tungsten carbide-tipped inserts for roughing, two for finishing and one for chamfering. At the last station, six .120-inch diameter holes are drilled and the completed part is ejected. Capacity of this machine is 100 parts an hour.

Used in conjunction with the housing is a torque converter housing adapter plate shown on p. 51. This part is ground on a Gardner No. 125-30 double horizontal spindle grinder removing 0.040-0.050 inch per face. Area of the two faces is 90 square inches and parallelism must be held to 0.001 inch.

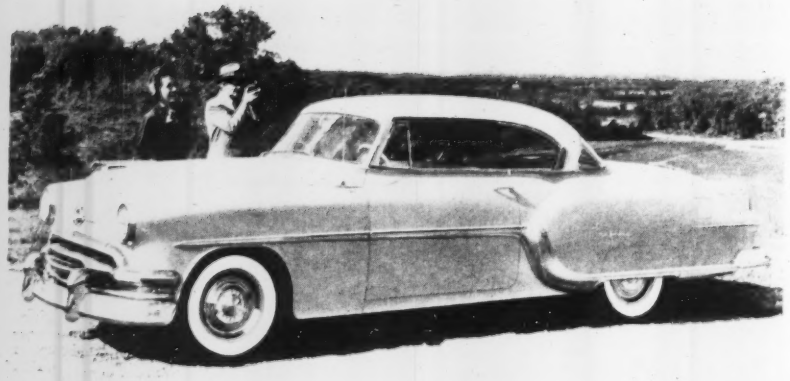
Auto, Truck Output

U. S. and Canada

	1953	1952
January	612,815	424,559
February	623,793	464,577
March	752,474	525,024
April	782,453	570,464
May	685,390	542,559
June	713,206	542,479
July	757,595	226,134
August	641,152	322,755
September	605,228	595,715
October	651,153	656,767
November		548,782
December		569,745
Total		5,989,509

Week Ended	1953	1952
Nov. 14	115,748	146,825
Nov. 21	108,252	129,224
Nov. 28	74,290	117,315
Dec. 5	123,148	129,005
Dec. 12	108,834	121,590
Dec. 19	110,000*	134,933

Source: Ward's Automotive Reports
*Estimated by STEEL



A sleeker look with its 124-inch wheelbase and extra 11 inches in over-all length is the highlight of Pontiac's new Star Chief Custom Catalina, shown above. Below: A unique air-conditioning system which is entirely front-mounted is offered as a factory-installed accessory on 1954 Pontiac Eights

Diameter of the wheels is 30 inches, 46 grit.

Technique—The adapter plate is held loosely in a keeper which is slightly thinner than the part. The grinding wheels are separated enough to permit the introduction of the part and the keeper between them until about $\frac{1}{3}$ of the part is between the wheels. The wheels then are advanced simultaneously to contact the work which is rotated slowly by its keeper through a V-belt. A Michigan drill-head special four-station trunnion-type machine then drills, reams and taps all holes to complete the part at 120 pieces an hour.

The top surprise comes when the unit is finally assembled on the engine. The alignment is closer when the parts are machined individually than they were when the housing was finished right on the engine, another example of the Detroit manufacturing magic.

Pontiac, Chevvy Introduced

Exciting new power, accentuated beauty and mechanical improvement highlight Chevrolet and Pontiac for 1954, say the ad men.

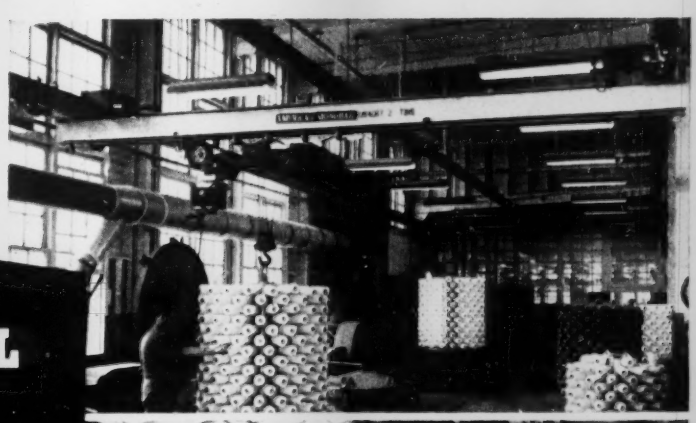
Pontiac's new Star Chief is designed to move up a bit into the middle-priced bracket with 124-inch wheelbase instead of 122 inches, as the other lines, and a body 11 inches longer. In other words, the Star is strictly in the ascendance.

Special features of Pontiacs include an air conditioning system completely in the front of the car. The conventional compressor is mounted on the engine with the evaporator mounted under the right front fender, and fresh, cooled air is delivered to the interior through three dash-mounted tubes. All are indicative of the deluxe trend among the lower-priced cars.

Incidentally, in addition to hiking horsepower from 122 to 127 in eight-cylinder Hydra-Matic jobs, Pontiac also introduces Aldip valves. The head of both intake and exhaust valves is given the molten aluminum dip, and the thin layer of aluminum which adheres to and combines with the steel is expected to double valve life through better high temperature resistance.

Chevrolet has gone to 115 hp in gearshift models, 125 hp with Powerglide which is now available on all cars. Attacking the valve problem as did Pontiac, Chevrolet comes up with alloy steel in exhaust valves for greater strength at high temperatures and resistance to scaling and pitting.

USE MONORAIL CRANES



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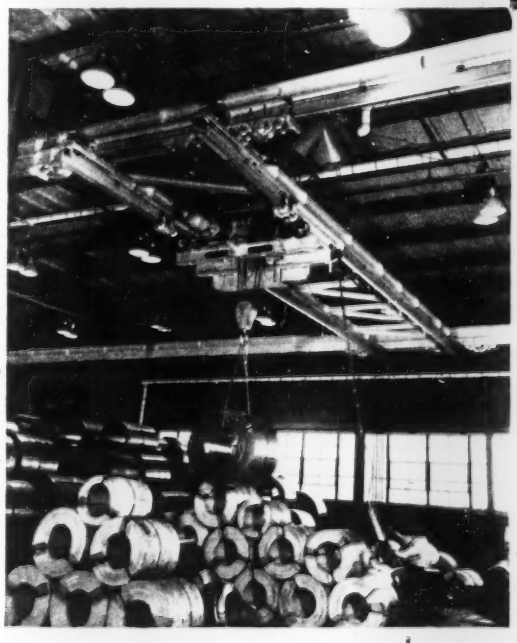

These are just a few reasons why American MonoRail Cranes are gaining in popularity and are being installed in increasing numbers of plants the country over. Call in your American MonoRail representative and have him tell you all the advantages of MonoRail Cranes such as—ease of handling—smooth travel—strength—safety interlocks—power operation and **interlocking carrier service between and beyond the craneways.** Consultation in connection with any handling problem is available without obligation.

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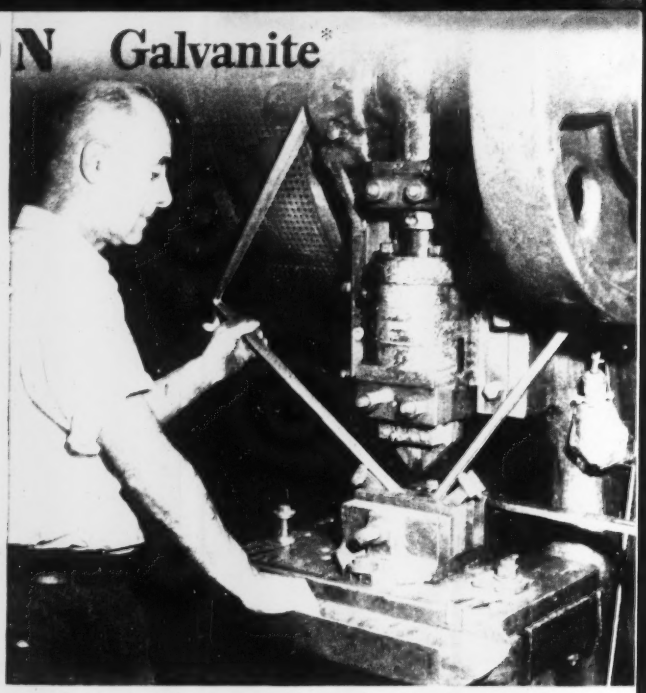
SHARON Galvanite*



Manufacturer of Suitcase Frames Solves Rust Problem with Galvanite*

One of the oldest and largest manufacturers of steel frames which are used in the construction of soft side luggage has recently switched to Galvanite* to eliminate japanning and a rust condition that had been a production headache.

The company found that by using Galvanite* they could eliminate painting and disregard the rust possibility. They found, too, that Galvanite* formed with all the ease of plain steel and took a 90 degree channel bend without flaking or peeling.

If you are using, or plan to use, coated metals it will pay you to find out why more and more manufacturers are switching to Sharon's popular special process zinc coated Galvanite*.

Send for your copy of Sharon's New Galvanite Handbook*

*Trade name copyrighted by the Sharon Steel Corporation

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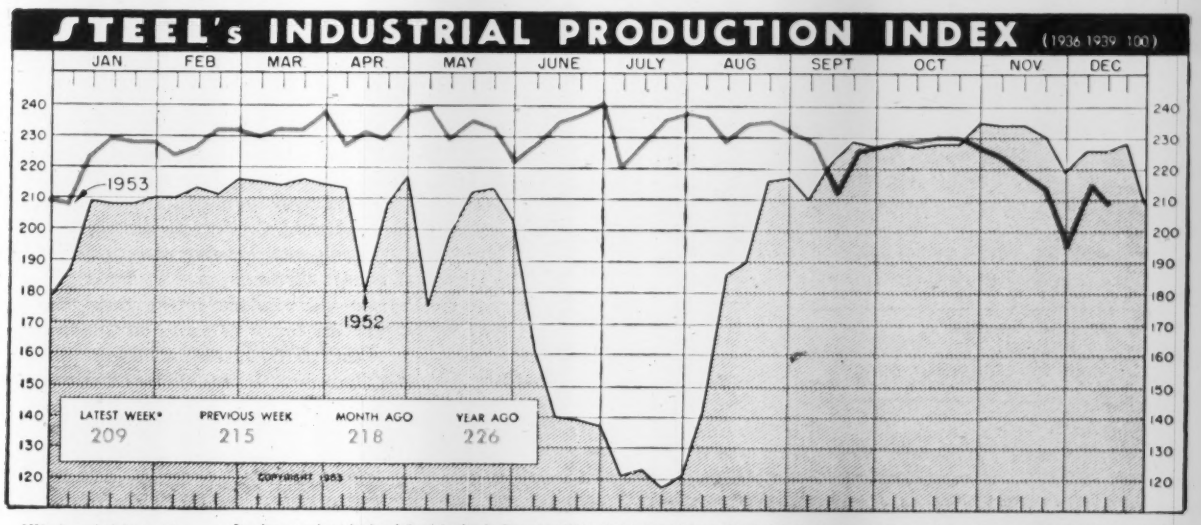
SHARONSTEEL

*Wherever Rust is a Problem—Specify Galvanite**

SHARON STEEL CORPORATION *Sharon, Pennsylvania*



*Week ended Dec. 12. Based upon and weighted as follows: Steelworks Operations 35%; Electric Power Output 23%; Freight Car Loadings 22%; and Automotive Assemblies (Wards' Reports) 20%.

Business Whittles Down Its Inventories

IF ANY REDUCTIONS are made in total business inventory during the first quarter of 1954, they will probably be similar to the inventory change which took place in November. While business inventories in November rose $700 million above the preceding month and totaled $79.4 billion, on a seasonally adjusted basis they actually declined $350 million from September, the Office of Business Economics says.

Production cutbacks combined with high, but slipping, sales to cause this seasonal inventory reduction, which was equally divided between durables and nondurables. The seasonal slide reached the manufacturing and retail levels, each showing declines of $200 million from the preceding month, but failed to take effect at wholesale, where stocks were $100 million higher than in September.

Auto Inventories To Rise . . .

The increased factory sales of automobiles anticipated by manufacturers in the first quarter of 1954 indicate that this segment of total inventories will rise. Even though high sales are forecast, it will take more than three months for dealer's sales to catch up with this production outburst. Production schedules for the first quarter of 1954 are 11 per cent higher than output in the first quarter of 1953 and would yield cars at the rate of 6.7 million a year.

Present restricted automobile output enabled dealers, as of Nov. 30, to hold new car stocks to nearly 8 per cent below the Oct. 31 postwar-high level. New car stocks averaged 25 per cent above a 30-day supply. And with the usual seasonal weakening of sales in December, along with greater production than in November, stocks will be rising again by the first of the year.

Output Slide Continues . . .

Among the industries continuing to slide productionwise is the steel industry. Estimated production for the week ended Dec. 20 of 1,917,000 net tons of ingots and steel for castings will be the lowest weekly outturn for the year.

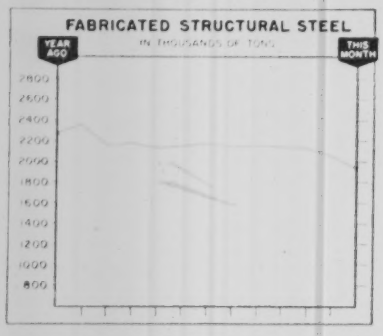
Production of electric bulbs also sheds light on the extent of the present output decline. The trend established in the third quarter when production declined to 228.3 million incandescent lamps from 284.3 million during the second quarter should continue during the present period.

Our Air-Lifted Economy . . .

Also decreasing was the backlog of aircraft orders in the third quarter. Unfilled orders of $18,278 million were 3 per cent below the backlog reported on June 30 by the Bureau of the Census but 14 per cent above the July-September period in 1952. As in June, orders for United States military customers represented 94 per cent of the aircraft backlog and 97 per cent of the unfilled aircraft engine orders. Military customers included in the backlog for aircraft propellers were down slightly from 91 per cent to 90 per cent.

Bottom of '53 Output Barrel . . .

On STEEL's index, industrial output at 209 per cent of the 1936-1939 average was the lowest, excluding holiday weeks, since Jan. 3. For the seventh consecutive week, production was below the comparable week in 1952. Auto model

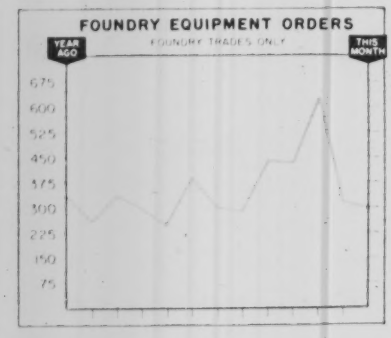


Fabricated Structural Steel

Thousands of Net Tons

	Shipments 1953	Shipments 1952	Backlogs 1953	Backlogs 1952
Jan.	241.4	244.9	2,180	2,416
Feb.	251.1	246.4	2,128	2,408
Mar.	266.3	268.8	2,153	2,501
Apr.	263.2	230.7	2,168	2,360
May	264.8	244.2	2,179	2,263
June	274.6	125.6	2,153	2,261
July	230.2	138.3	2,134	2,361
Aug.	251.1	226.3	2,122	2,363
Sept.	255.6	227.6	2,041	2,342
Oct.	289.8	261.7	1,927	2,266
Nov.		222.6		2,357
Dec.		225.2		2,153
Total		2,664.3		

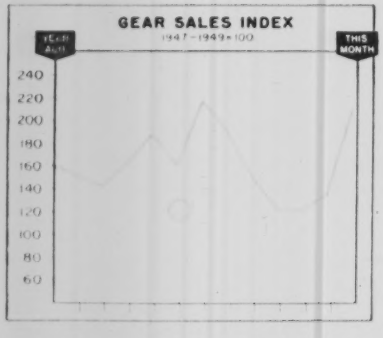
American Institute of Steel Construction.



Foundry Equipment Orders

	Index (1935-1939 = 100) 1953	Index (1935-1939 = 100) 1952	Value, Thousands 1953	Value, Thousands 1952
Jan.	301.0	161.5	$1,379	$1,862
Feb.	207.3	209.4	1,179	922
Mar.	296.7	310.0	1,818	1,427
Apr.	303.0	385.1	1,305	1,773
May	294.4	225.2	1,568	1,037
June	116.8	353.8	2,598	1,629
July	440.8	243.9	2,362	1,583
Aug.	633.3	311.6	3,615	1,434
Sept.	317.2	365.9	1,576	1,685
Oct.	202.9	335.8	1,099	1,548
Nov.		258.1		1,183
Dec.		343.3		1,573

Foundry Equipment Mfrs. Assn.

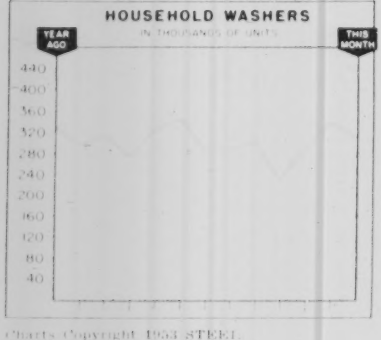


Gear Sales Index

(1947-1949 = 100)

	1953	1952	1951
Jan.	161.4	670.6*	764.6*
Feb.	188.1	539.5*	809.1*
Mar.	158.9	517.1*	830.7*
Apr.	217.1	478.7*	742.5*
May	189.8	425.9*	661.7*
June	146.5	452.3*	800.9*
July	120.7	145.3	589.1*
Aug.	121.6	132.3	564.2*
Sept.	135.6	143.4	630.0*
Oct.	211.1	160.8	703.4*
Nov.		150.9	530.0*
Dec.		140.9	716.5*

*(1935-1939 = 100)



Household Washers

Sales Billed Units

	1953	1952	1951
Jan.	277,309	213,998	321,092
Feb.	326,604	255,864	341,328
Mar.	345,989	248,431	368,456
Apr.	288,474	217,211	292,193
May	286,515	213,668	263,942
June	304,086	274,457	243,119
July	228,268	207,593	139,799
Aug.	294,200	234,537	239,081
Sept.	340,342	283,732	313,756
Oct.	310,867	327,814	297,210
Nov.		263,079	262,484
Dec.		310,661	218,664
Totals		3,101,045	3,301,123

American Home Laundry Mfrs. Assn.

Charts Copyright 1953 STEEL

Issue Dates on other FACTS and FIGURES Published by STEEL

Construction	Nov. 30	Ironers	Nov. 23	Ranges, Gas	Oct. 12
Durable Goods	Dec. 14	Machine Tools	Dec. 7	Refrigerators	Nov. 2
Employ., Metalwk.	Nov. 30	Malleable Castings	Dec. 14	Steel Castings	Dec. 14
Employ., Steel	Nov. 30	Prices, Consumer	Dec. 7	Steel Forgings	Dec. 7
Freight Cars	Nov. 23	Prices, Wholesale	Nov. 30	Steel Shipments	Oct. 12
Furnaces, Indus.	Dec. 7	Pumps	Nov. 16	Vacuum Cleaners	Oct. 12
Gray Iron Castings	Dec. 14	Radio, TV	Nov. 23	Wages, Metalwk.	Nov. 9
Indus. Production	Nov. 23	Ranges, Elec.	Nov. 2	Water Heaters	Nov. 9

changeovers and reduced loadings of railroad revenue freight caused this latest tumble.

Freight Movement Slowed . . .

Acceleration of the decline in railroad freight car loadings in recent months as compared with the same months in 1952 may have been responsible for the statement of David C. Bevan, financial vice-president, Pennsylvania Railroad, that earnings of the PRR would be quite a bit lower than recent estimates of $44 million to $45 million. This latest earnings opinion also must be considered in connection with Mr. Bevan's statement that volume of the PRR in 1954 will be about 15 per cent under this year. In November and December, car loadings on the nation's railroads fell 12 per cent below year-ago levels.

Truck-Carriers Riding High . . .

Railroads evidently are bearing the brunt of production cutbacks, for the tonnage carried by intercity motor truck carriers climbed to an all-time high during the third quarter of 1953, according to American Trucking Associations Inc. Class I intercity common and contract carriers hauled 54,729,430 tons in the third quarter, 11.5 per cent above the comparable quarter in 1952.

TV Boom Fading . . .

Television production for the first ten months of the year of 6,204,803 sets established a new record, according to the Radio-Electronics-Television Manufacturers Association. But an appreciable part of this production still gathers dust on dealers' shelves due to the drastic sales slump this fall. Result: Some manufacturers have reduced output; others have gone even further and laid off some of their employees.

Work Down; Earnings Steady . . .

Many of the production cutbacks in various industries have caused reductions in employment. Nonfarm employment of 49.2 million in mid-November, according to the Bureau of Labor Statistics, con-

BAROMETERS OF BUSINESS

	LATEST PERIOD	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Output (per cent of capacity)[2]	85.0	87.0	105.0
Electric Power Distributed (million kwhr)	8,661	8,582	8,140
Bitum. Coal Output (daily av.—1000 tons)	1,368	1,233	1,692
Petroleum Production (daily av.—1000 bbl)	6,225[3]	6,179	6,562
Construction Volume (ENR—millions)	$655.1	$294.4	$211.0
Automobile, Truck Output (Ward's—units)	108,834	123,118	121,590
TRADE			
Freight Car Loadings (unit—1000 cars)	660[3]	662	721
Business Failures (Dun & Bradstreet, no.)	190[3]	202	157
Currency in Circulation (millions)[3]	$30,904	$30,791	$30,370
Dept. Store Sales (changes from year ago)[3]	3%	4%	+5%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$17,199	$16,947	$16,357
Federal Gross Debt (billions)	$275.0	n.a.	$267.2
Bond Volume, NYSE (millions)	$14.9	$15.5	$19.9
Stocks Sales, NYSE (thousands of shares)	7,069	8,525	9,625
Loans and Investments (billions)[4]	$80.5	$80.4	$78.3
U. S. Gov't Obligations Held (billions)[4]	$32.8	$32.7	$32.9
PRICES			
STEEL's Finished Steel Price Index[5]	189.74	189.74	181.31
STEEL's Nonferrous Metal Price Index[6]	206.6	204.8	213.2
All Commodities[7]	110.1	110.1	109.6
Commodities Other Than Farm & Foods[7]	111.6	111.6	112.9

[1]Dates on request. [2]Preliminary. [3]Weekly capacities, net tons: 1953, 2,254,450; 1952, 2,077,040. [4]Federal Reserve Board. [5]Member banks, Federal Reserve System. [6]1935-1939=100. [7]1926-1936=100. [8]Bureau of Labor Statistics Index, 1947-1949=100

stituted a decline of about 370,000 over the month. This decline shows up especially on manufacturing payrolls, which dropped 300,000 during the month, a drop of six times the normal number, as measured by the 1947-1952 period. Substantial declines occurred in primary and fabricated metals, machinery, electrical machinery, transportation equipment, rubber and textiles.

A companion of the employment drop was the slide in the average workweek from 40.3 hours in October to 39.9 hours in November. That made the month the first November in four years when the workweek was not appreciably above 40 hours. The electrical machinery and ordnance sectors showed a marked curtailment of the workweek.

Even with these cutbacks, average hourly earnings of production workers of $1.78 were at record levels and unchanged from the preceding month.

Sales Slide Seasonally . . .

The retarded sales of recent months have shown up at the retail level. Cumulative sales of all retail stores in the U. S. for the first ten months were 5 per cent ahead of the comparable period in 1952. However, sales in October of $15.0 billion were only 1 per cent ahead of October, 1952. Motor vehicle dealers, with a 24 per cent increase over the similar ten-month period last year, raised their sales the most. The continuing trend of all retail sales is evidently moving down further, for department store sales during the four weeks ended Dec. 5 were 2 per cent below the comparable period a year ago. These figures, however, may depict a worse situation than is warranted due to the recent strikes affecting newspapers and advertising in New York and Pittsburgh.

Trends Fore and Aft . . .

The $24-million decrease in loans to the wholesale and retail trade as revealed in the combined statement of the weekly reporting member banks of the Federal Reserve System was the largest weekly decrease in this category during the year and seems to denote falling confidence in the near future . . . The dip in the consumers' price index of the National Industrial Conference Board bears out the Department of Labor statement of a few weeks back that consumer prices would be leveling off in the near future.

THIS Pair OF TICKETS

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Really those tickets are tags we attach to customer shipments here at Kenilworth to identify specific strip steel products. One is a true precision cold rolled strip steel with qualities and characteristics best for many fabrication jobs; the other is cold rolled sheet coil slit to width and also just right for many jobs. We stock and sell both —there is no argument—but we sell and identify each one for what they are and try to help you decide which is best for your need. Well, you should expect that from a specialist in flat rolled metal products—but, if you're not acquainted with this kind of service we would like you to know it's typical of Kenilworth's interest in every inquiry and order. Try us today.

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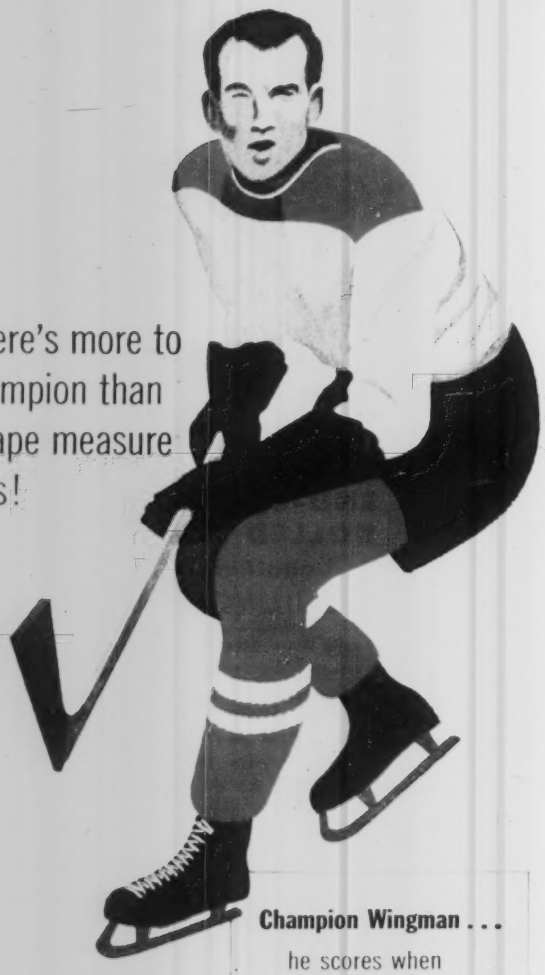
...there's more to a champion than the tape measure shows!

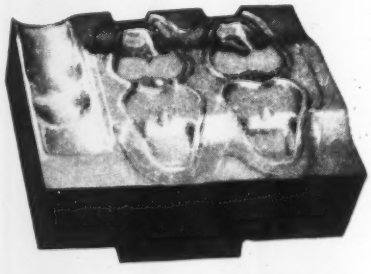


Champion Wingman . . .
he scores when
the pressure's on.

Average Wingman . . .
he may measure the
same—but he's stopped
in the close ones.

HARDTEM DIE BLOCKS perform like "champions" in your production line!

Heppenstall Die Blocks perform like champions because they possess those extras that result in superior performance on the job. Their patented steel analysis resists softening and heat checking in service. Records from Plants using Hardtem Die Blocks prove the following benefits for production.



★ Long Life of Dies ★ Holding of True Dimensions
★ Longer Production Runs ★ Lower Overall Die Cost
★ Reductions in Down Time

It will pay you to try Hardtem Die Blocks. Call Heppenstall Company, Pittsburgh 1, Pa. Sales offices in principal cities.

Heppenstall

. . . the most dependable name in die blocks

RAYMOND SELLON JR.
. . . heads new division at Stolper Steel

J. P. GILL
. . . Vanadium-Alloys Steel president

E. H. FRANK
. . . Washington Steel plant supt.

Raymond Sellon Jr. heads the newly formed product research development division of **Stolper Steel Products Corp.**, Menomonee Falls, Wis., sheet metal fabricator.

James O. Flower was elected president, **Vulcan Crucible Steel Co.**, Aliquippa, Pa., to succeed **Stephen B. Minton**, retired. He was operating vice president and treasurer. **Alfred D. Beeken** was elected vice president and **William O. Campbell** became vice president-treasurer.

Baldwin - Lima - Hamilton Corp., Philadelphia, appointed **John J. Littley** assistant sales manager, hydraulic press and power tool department.

Tower Iron Works, Providence, R. I., appointed **R. K. Muller** chief engineer. He will head the engineering and estimating department.

Thomas M. Desmond, formerly with the Office of International Trade as chief of the minerals and tin plate section, has joined **Livingston & Southard Inc.**, New York, a division of Luria Bros. & Co. Inc.

Anderson Bros. Mfg. Co., Rockford, Ill., elected **Ralph F. Anderson** president to succeed **Swan F. Anderson**, now chairman of the board. The new president retains his position of treasurer.

J. P. Gill now heads **Vanadium-Alloys Steel Co.**, Latrobe, Pa., which he joined in 1920 as chief metallurgist. **Roy C. McKenna** continues as chairman of the board in an active capacity as the chief executive officer of the company. Mr. Gill, who also is president of Colonial Steel Division and Vanadium-Alloys Steel Canada Ltd., was elected vice president of the parent firm in 1943 and in 1945 became chairman of the executive committee.

Bridgeport Brass Co., Bridgeport, Conn., appointed **Irving M. Malsch** sales manager, mill products, and **John C. Miller** assistant sales manager. **Richard L. Allen** was made general sales manager to succeed the late **Chester M. Adams**.

A. G. Jason heads the Milwaukee district office for **Sipi Metals Corp.**, and **J. H. Homan** is manager at Cincinnati.

John Segrave was promoted to assistant sales manager, rolled steel products division, **Emergency Steel Service Corp.**, Skokie, Ill.

F. Doyle Bowers was made southern district manager at Atlanta for **Republic Rubber Division**, Lee Rubber & Tire Corp. He also will supervise field representatives in Jackson, Miss., Chattanooga, Tenn., and Columbia, S. C.

E. H. Frank was appointed plant superintendent, **Washington Steel Corp.**, Washington, Pa. Prior to joining the firm in 1946 he spent a number of years with Eastern Stainless Steel Corp. Other appointments include **Harry Beecham** as superintendent, finishing department, and **Harold Anderson**, superintendent, shipping department.

Standard Railway Equipment Mfg. Co., Chicago, appointed **Jean-Claude Lessard** vice president of its Canadian subsidiary with executive offices at Montreal.

W. C. Sheers, formerly manager of service and quality control, was made plant manager of **Standard Horse Nail Corp.**, New Brighton, Pa. **O. J. Molter**, former superintendent, will be associated with Mr. Sheers as time estimate and process consultant.

Buffalo Forge Co., Buffalo, elected **William R. Heath** vice president-manufacturing and **Arthur M. Kiely** vice president-finance, both newly created positions.

John S. French was made assistant general manager, parts and equipment manufacturing division, **Ford Motor Co.**, Dearborn, Mich.

Melvin B. Monson was made assistant manager of **Joseph T. Ryerson & Son Inc.**'s Milwaukee steel serv-

LANCE H. COOPER
. . . Inco vice president

MAXWELL D. MILLARD
. . . new position at AS&W

FREDERICK L. MALTBY
. . . Fielden Instrument technical director

ice plant. He was manager, work order department, Chicago plant.

Lance H. Cooper was elected a vice president of **International Nickel Co. of Canada Ltd.**, Copper Cliff, Ont. He is chairman of subsidiary, Mond Nickel Co. Ltd. He assumes his new office Jan. 1, 1954.

W. L. Fabianic became executive assistant to L. C. Hewitt, vice president and director of research at **Laclede-Christy Co.**, St. Louis.

Adelbert H. Loux was appointed general sales manager, **Flexible Tubing Corp.**, Guilford, Conn.

Gifford M. Randall was placed in charge of development work on the West Coast for **Kaiser Engineers Division**, Henry J. Kaiser Co. He will be located in Oakland, Calif. **Arthur C. Stern** joins the division's air and stream pollution engineering group.

Promotions at **Electric Storage Battery Co.**, Philadelphia, include **C. J. Moore** as industrial products sales manager, **W. E. Nyce** as manufacturing manager, industrial products, and **L. E. Wells** as director of research and engineering, industrial products.

Dr. Berton S. Clark has resigned from **American Can Co.**, New York. He was scientific director of its research and technical department and with the firm 38 years.

Maxwell D. Millard fills a newly created position at U. S. Steel Corp.'s **American Steel & Wire Division** at Cleveland. He will serve as assistant general manager of sales, assisting John Graham, general manager-sales. Formerly Detroit district manager of sales for the division, he is replaced by **Edward A. Murray**, who since 1949 has been manager of sales at Chicago.

Willard H. Spence was appointed assistant to vice president-sales, **Brown & Sharpe Mfg. Co.**, Providence, R. I., and will assist in general administration of the sales division. **Earl P. Leeds** was named general sales director, domestic machine tool sales. **James Meehan**, sales director, assumes direct responsibility for domestic milling machine sales in addition to domestic grinding machine sales.

James C. Glascock, assistant chief work engineer at the Massena, N. Y., Works of **Aluminum Co. of America**, transfers to the post of assistant chief work engineer at the Davenport, Iowa, Works. He is succeeded by **James C. Post**.

Roland S. Higgins is now associated with **Lake Erie Engineering Corp.**, Buffalo, as a member of its headquarters staff.

Charles H. Squarcy was appointed superintendent of the blast furnace department at **Inland Steel Co.'s** Indiana Harbor, Ind., Works. He succeeds **James F. Peters**, retired.

Robertshaw-Fulton Controls Co., **Fielden Instrument Division**, Philadelphia, appointed **Frederick L. Maltby** technical director in charge of research, development and design facilities. He previously served in various capacities at Bristol Co.

Edward A. Murphy was named sales manager, **Lehigh Structural Steel Co.**, Allentown, Pa., to succeed **Leo I. Bruce**, retired. **Carlton K. Reinsmith** was made assistant to the sales manager following retirement of **Anna B. Ritter**, assistant sales manager, who had been affiliated with Lehigh Structural Steel since 1919.

James F. Baxa was appointed vice president-general manager of sales at **Ackermann Mfg. Co.**, Wheeling, W. Va., subsidiary, Wheeling Steel Corp. **George E. Martin** assumes manufacturing duties formerly performed by Mr. Baxa as general manager of the Ackermann factory.

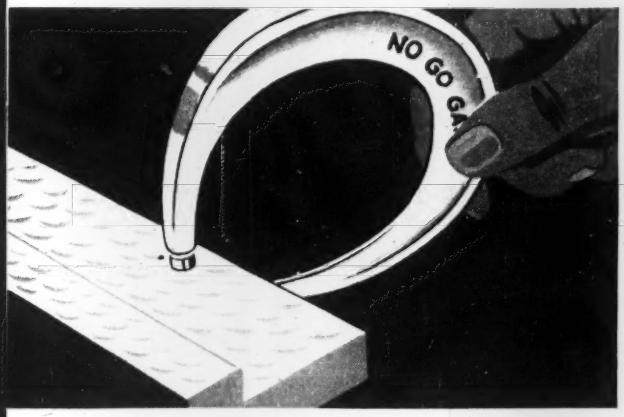
Turco Products Inc., Los Angeles, appointed **Paul R. Pariseau** assistant to the president on special assignments.

John J. O'Brien becomes manager, industrial engineering department, **Trane Co.**, La Crosse, Wis. He formerly managed the manufacturing engineering department for the Milwaukee Hotpoint Division plant.

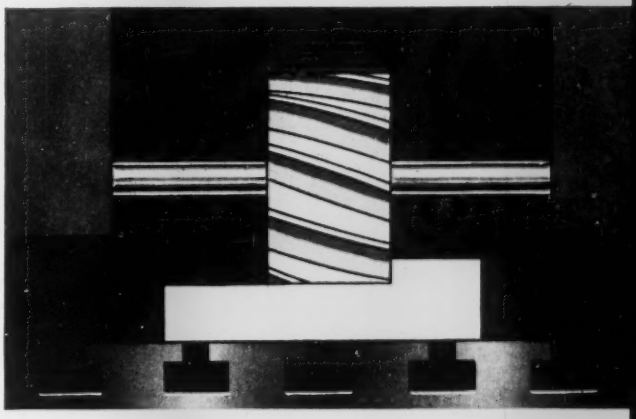
C. Burton Clark, a member of the research department of **Harbison-**

HOW TO END DAMAGED WAYS, PRODUCTION LOSSES

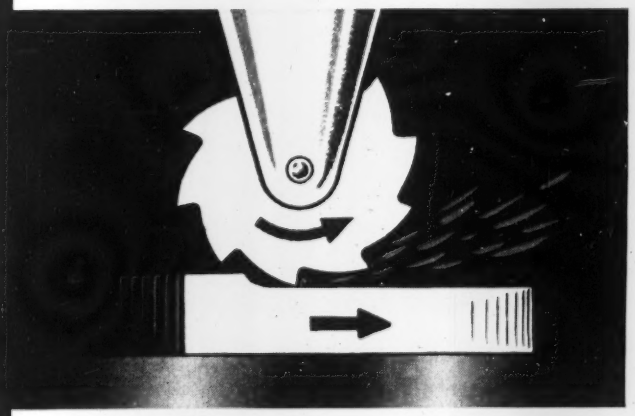
Sunoco Way Lubricant Stops "Jumpy Table"



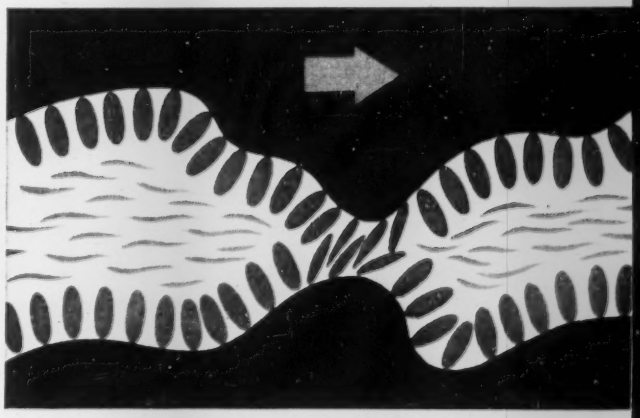
Tool chatter and jumpy table are machining headaches. Too often they cause poor surface finish, failure to hold tolerances, production losses.



Tool chatter is a result of a lack of rigidity in either the machine or the set-up. It is a mechanical problem and no lubricant can lick it.



Jumpy table is a stick . . . slip . . . stick . . . slip action of the table. It is a lubrication problem. Though just as damaging as tool chatter, it is not always detected when the cause of poor surface finishes.



Extreme magnification

Sunoco Way Lubricant cures jumpy table. It contains special compounds that form a film, like the nap of a rug, on the sliding surfaces and minimize the force of both static and kinetic friction.

Why take a chance of damaging your ways? These integral parts of the base casting for your machine are difficult to refinish and costly to replace. For information about Sunoco Way Lubricant, call a Sun office or write SUN OIL COMPANY, Philadelphia 3, Pa., Dept. S-12.

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SUN OIL COMPANY

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PETER R. LETCAVITS
. . . gen. supt. at Republic's strip mill

EDGAR D. LEON
. . . heads Gear Grinding Machine

J. A. JEAN
. . . joins Fray Machine Tool Sales

Walker Refractories Co., Pittsburgh, since 1937, was named senior mineralogist.

Peter R. Letcavits was named general superintendent of **Republic Steel Corp.'s** 98-inch strip mill in Cleveland. He succeeds **G. N. Harmon**, assigned other duties in the corporation. Mr. Letcavits is replaced as superintendent of the Enduro Division by **Louis G. Briegel**, formerly assistant superintendent.

Jack N. Yetter was named manager of sales promotion of **Twin Disc Clutch Co.**, Racine, Wis., and is succeeded by **Mel H. Woodward** as manager, Tulsa, Okla., district.

Gerard T. Shannon was appointed managing engineer for the industrial engineering department, **Walter Kidde Constructors Inc.**, New York.

Edgar D. Leon was elected president and a director, **Gear Grinding Machine Co.**, Detroit. He assumes management and co-ordination of the company's three divisions: Rzeppa universal joints, grinding services and Geargrind machines. He was formerly with Hickory Pattern & Foundry Co., which he owned and operated for the last three years in Detroit.

Adm. Alan G. Kirk (ret.), former U. S. ambassador to Russia, was named chairman of the board and chief executive officer of **Mercast Inc.**, New York.

Dave Wooster was appointed works engineer, **Basic Refractories Inc.'s** Gabbs, Nev., plant.

Asa Farrell was promoted from superintendent to works manager of **Lyco Machine Works**, Oakland, Calif.

J. A. Jean has joined **Fray Machine Tool Sales Corp.**, Glendale, Calif., as sales manager. He has many years' experience in the machine tool industry.

Veryl W. Graze returns to the Central District, **Republic Steel Corp.**, Massillon, O., where he assumes duties in the metallurgical department. He was granted an extended leave of absence to serve with the National Production Authority in Washington.

Kenneth M. Edwards becomes manager of **Ford Motor Co.'s** Green Island plant at Albany, N. Y. He succeeds **Charles H. McCormick**, promoted to another manufacturing assignment to be announced later.

Oscar F. Stewart was promoted to comptroller, **Commercial Contracting Corp.**, Detroit.

OBITUARIES . . .

A. Donnally Armitage, 81, chairman of the board, **J. H. Williams & Co.**, Buffalo, died Dec. 2.

Sherwood H. Standish, 70, vice president in charge of engineering, **Dayton Malleable Iron Co.**, Dayton, O., died Dec. 4.

H. H. St. Clair, 74, president, **Kaydel Corp.**, New York, died Dec. 12.

Jesse E. Sanger, supervisor of production control at **General Motors Corp.'s** Moraine Products Division, Dayton, O., died Dec. 3.

Walter A. Kirsch, 53, president, **Spray-Rite Enameling Co.**, Milwaukee, died Dec. 8.

R. F. Feind, 64, a special engineer in the processing machinery department, **Allis-Chalmers Mfg. Co.**, Milwaukee, died Dec. 4.

Edward A. Slye, 76, inventor and official of **Veeder-Root Inc.**, Hartford, Conn., died Dec. 5.

Henry W. Chandler, 51, manager of programing for **General Electric Co.'s** aircraft gas turbine division, Everett, Mass., died Dec. 3.

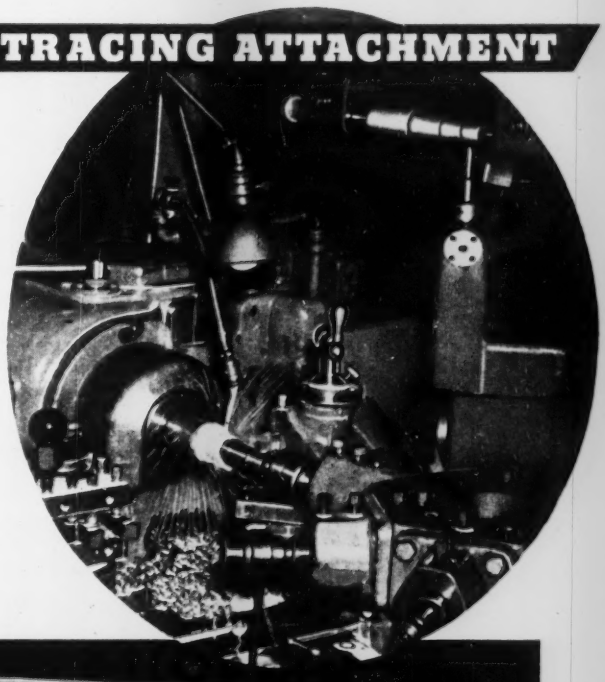
Chester I. Hall, 65, retired engineer of **General Electric Co.**, died Dec. 6 in Boston.

Joseph F. Woschitz, 53, chief of the metallurgical laboratories research and development department of **Inland Steel Co.**, East Chicago, Ind., died Dec. 10.

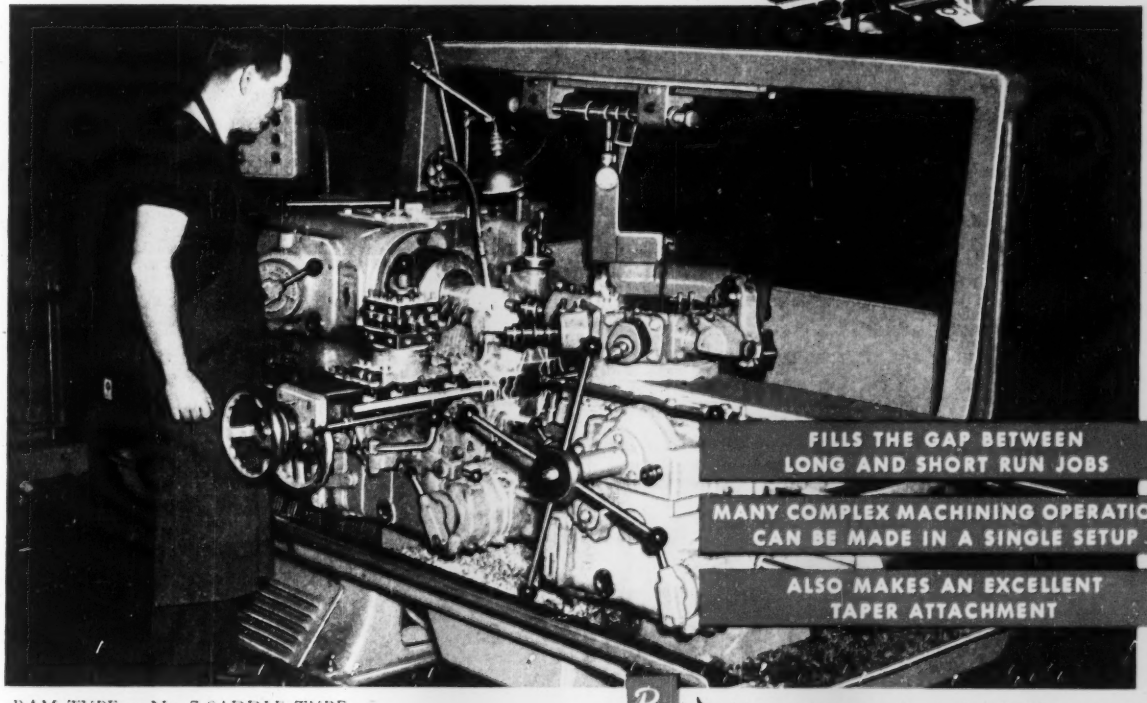
J. G. Knipper, 84, co-proprietor of **Joseph G. Knipper & Sons**, Rochester, N. Y., died Dec. 6.

NEW HYDRAULIC TRACING ATTACHMENT

for J&L turret lathes*



Will reduce your costs —direct and indirect—by combining in a single machine all the advantages of TRACING for contour turning, boring or facing operations, with the advantages of multiple tooling and the many other time saving, cost saving features of J & L Universal Turret Lathes.



FILLS THE GAP BETWEEN LONG AND SHORT RUN JOBS

MANY COMPLEX MACHINING OPERATIONS CAN BE MADE IN A SINGLE SETUP

ALSO MAKES AN EXCELLENT TAPER ATTACHMENT

*RAM TYPE or No. 7 SADDLE TYPE

P.S. This attachment can be purchased with new machines or installed in the field on machines now in service. Write for descriptive leaflet giving complete specifications.

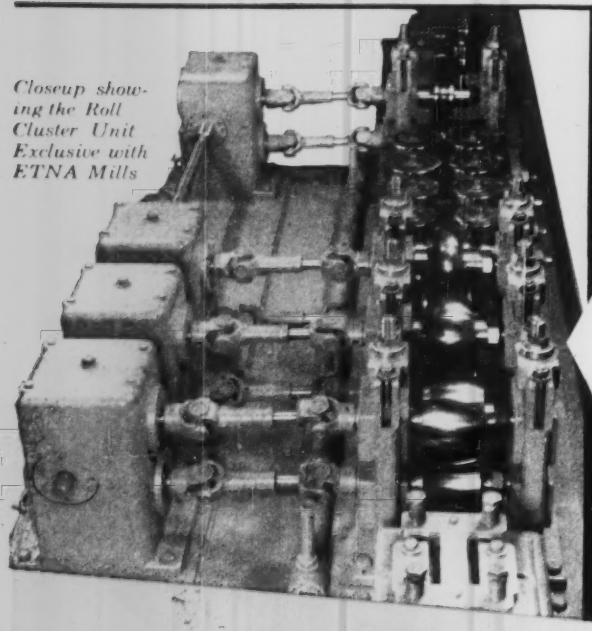
JONES & LAMSON

Machine Tool Craftsmen Since 1835

JONES & LAMSON MACHINE CO., 517 Clinton St., Dept. 710, Springfield, Vt., U.S.A.

J&L TURRET LATHE DIV.

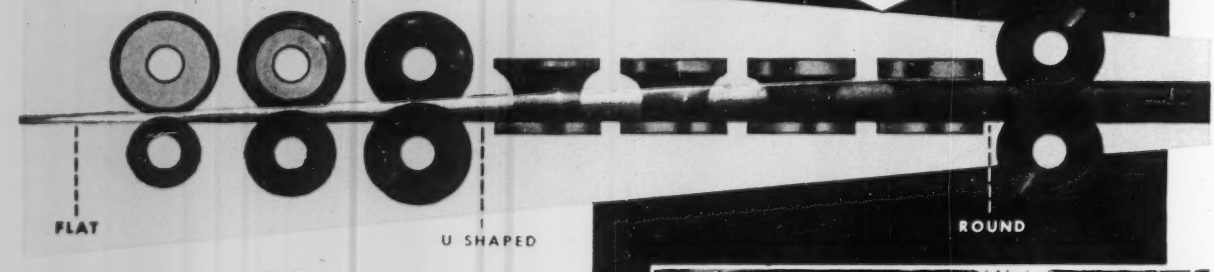
LEADING THE INDUSTRY IN DESIGN...



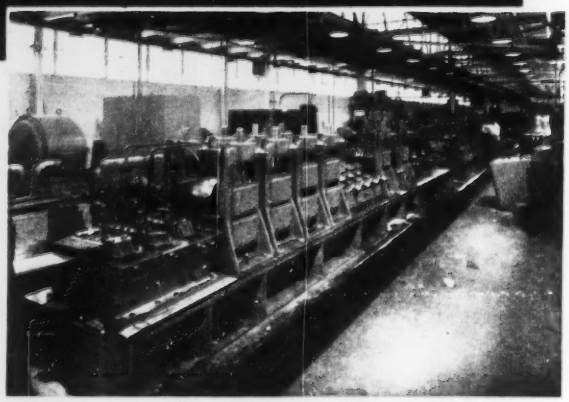
Closeup showing the Roll Cluster Unit Exclusive with ETNA Mills

NO MARKING . . . NO SCRATCHING
NO UPSET EDGES . . .

THE *Etna* METHOD
FOR SMOOTH, WELL FORMED STEEL TUBING



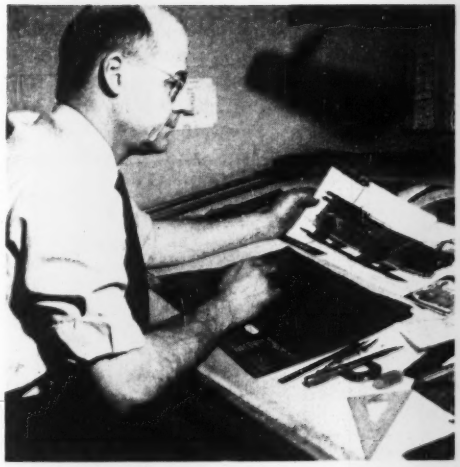
Exclusive with Etna is the cluster unit. This unit progressively rolls the tube into shape without excessive stretching of the edges, thereby eliminating the "buckling" experienced with ordinary tube mills. Etna machines are not forming mills, they are designed for one purpose only . . . to make clear, well formed carbon and stainless steel tubing with no marking, no scratching, no upset edges. Write for complete details.



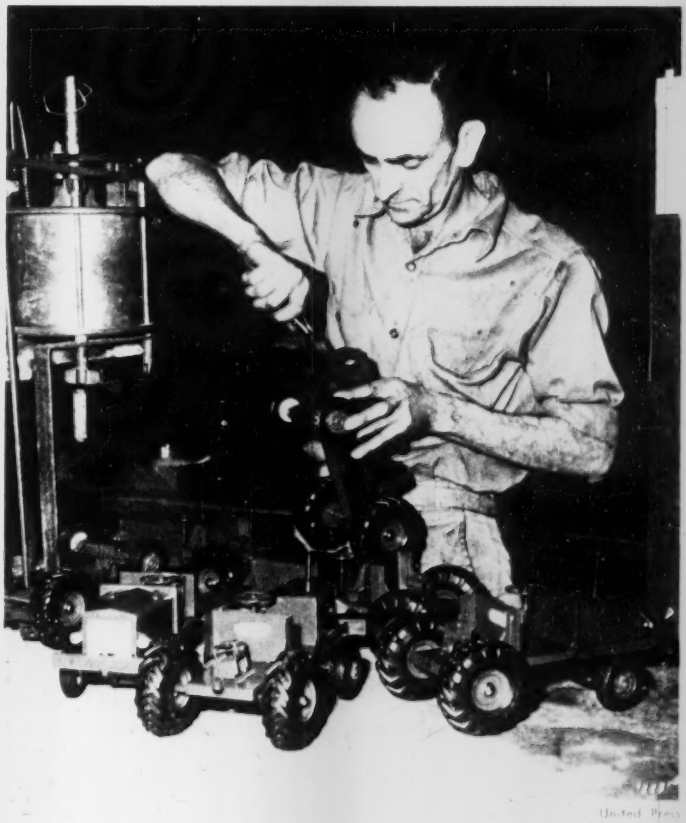
The ETNA 4KU Mill

Abbey ETNA *Company*

3402 MAPLEWOOD AVE., TOLEDO 10, OHIO



The engineering department carefully reduces plans for the model toys to one-sixteenth the size of the originals. Great care is taken to make the toys authentic and as much detail as possible is retained in the reduced scale



Near the end of the Doepke assembly line, headlights are added to a scale model earth mover which looks much like a real one

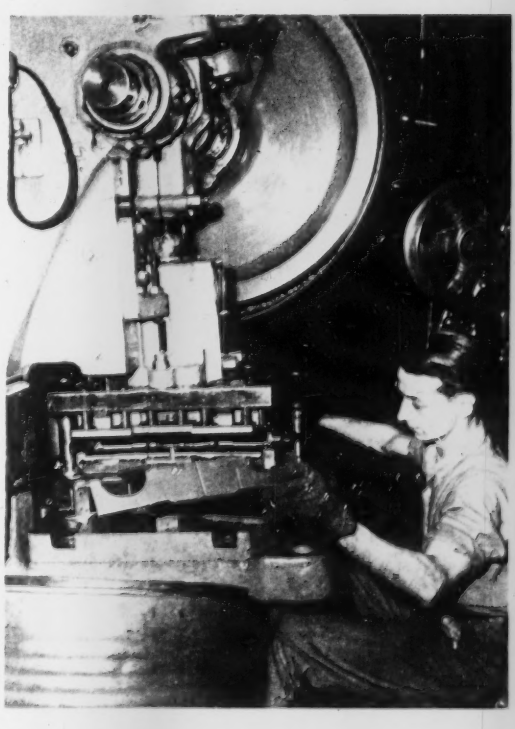
United Press

Toys "Like the Big Ones" Turn Pleasure Into Profits

MODEL TOYS real enough to melt the sales resistance of any father have made the Santa Claus business a booming one for the Charles William Doepke Co. The Rossmoyne, O., toymaker expects 1953 to be its biggest year yet.

Doepke specializes in making scale models of road graders, bottom dump trucks, bucket loaders, mobile cranes and fire engines, all reduced to one-sixteenth size. By the end of 1953 some 1.5 million Doepke toys will have been distributed around the world. Some of the first of them are probably still in use the company has been making them only since 1946.

In addition to its metal toy business, Doepke also makes nesting and tiering steel shop boxes.



Punch press operator at Charles William Doepke Co. stamps out a part that will eventually turn up on a fire engine or truck to brighten the eyes of a youngster (or his dad)

New Furnaces Constructed

Salem-Brosius builds one unit for Olin Industries and ten furnaces for Detroit Steel

SALEM - BROSIUS INC., Pittsburgh, completed construction of a 64-ft-long, oil-fired, continuous roller-hearth furnace for Winchester Repeating Arms Division of Olin Industries Inc. at New Haven, Conn.

The furnace is designed to heat 24,000 lb of brass slabs an hour from room temperature to 1500°F. The slabs are 4½ in. thick by 28 in. wide and range in length from 5 to 36 ft.

Portsmouth Project — Construction of 10 circular ingot heating furnaces, each 18 ft in diameter, has been practically completed by Salem-Brosius for Detroit Steel Corp.'s plant in Portsmouth, O.

The soaking pits are designed for burning mixed blast furnace and coke oven gas or bunker "C" oil. The installation includes temperature controls, combustion and pressure controls, cover cranes and Thermal Transfer Corp. type metallic needle recuperators for preheating combustion air.

The loading capacity of each furnace is 27 ingots measuring in cross-section 23 x 25 in., or 11 ingots measuring in cross-section 24 x 60 in. The furnace will accommodate ingots up to 90 in. long. Furnace operating temperature is 2350°F, with a fuel release of 30 million Btu's per hour per furnace.

Association Names Secretary

Magnesium Association, New York, appointed Jerry Singleton as its executive secretary. The announcement was made by James Kirkpatrick, president of the association and vice president of Brooks & Perkins Inc., Detroit.

Foundrymen's Group To Build

American Foundrymen's Society conducted a ground breaking ceremony in Des Plaines, Ill., for the new combined headquarters building and technical center to be built there with completion scheduled for 1954. AFS President Collins L. Carter, Albion Malleable Iron Co., Albion, Mich., presided. Also participating were Vice President Frank J. Dost, Sterling Foundry Co., Wellington, O., and Secretary-Treasurer William W. Maloney.

Elgin Offers Special Alloy

Elgiloy, a special alloy developed originally for watch mainsprings, has been released by Abrasives Division, Elgin National Watch Co., Elgin, Ill., for general industrial use. In addition to its use as a spring material, Elgiloy is being used also for flapper valves and diaphragms and is under test for fabrication of corrosion-resistant antifriction bearings.

Lehmann Acquires Rights

J. M. Lehmann Co. Inc., Lyndhurst, N. J., manufacturer of roller mills and other machinery for the process industries, acquired certain rights, title and interest in Wm. R. Thropp & Sons Corp., Trenton, N. J., including manufacturing rights and rights to the use of the Thropp company name. The latter company has become Wm. R. Thropp & Sons Division of J. M. Lehmann Co. Inc. All manufacturing and service facilities for Thropp products will be concentrated at the Lyndhurst plant.

Forms Missile Systems Division

Lockheed Aircraft Corp., Burbank, Calif., established a Missile Systems Division to deal exclusively in the design, development and production of pilotless aircraft and missiles. Heading the division as vice president and general manager is Elwood R. Quesada.

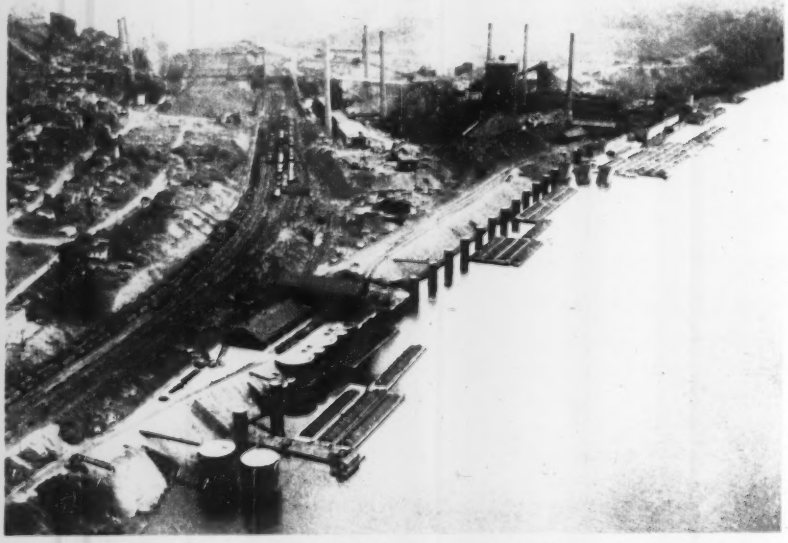
Equipment Maker Expands

Natural Gas Equipment Inc., Pasadena, Calif., manufacturer of gas burning and regulating equipment, moved into larger quarters at 804 S. Fair Oaks Ave., that city. An investment of about $450,000 is represented in land, equipment and inventory.

Details of a proposed merger of Wilgus Mfg. Co., Los Angeles, with Natural Gas Equipment Inc. have not been announced. However, the merger may be completed early next year. Wilgus Mfg. Co. makes regulators and liquid level controls.

A. O. Smith Names Agent

U. S. Steel Supply Division, United States Steel Corp., Pittsburgh, has been named West Coast distributor for welding products



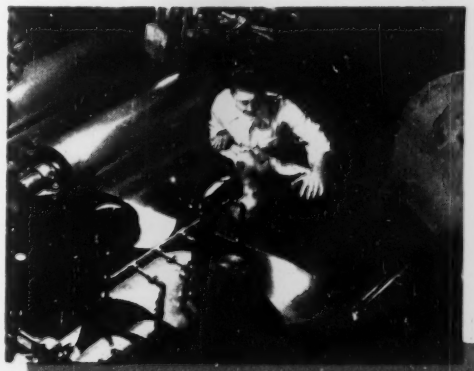
Weirton Steel Co. Expands Dock Facilities

One of the newest and largest docks on the Ohio river is this recently-completed facility operated by Weirton Steel Co., Weirton, W. Va. Built by Dravo Corp., Pittsburgh, the harbor and dock provide additional capacity for loading and mooring barges. The dock will handle increasing volumes of incoming coal, scrap and liquid cargo, as well as outgoing shipments of finished steel products

Like Diamond Cutting—

STEELMAKING, TOO, REQUIRES EXPERT WORKMANSHIP

Whatever your requirements for formability, uniformity, or drawing qualities, you'll find J&L Sheet & Strip . . . accurately and faithfully produced to meet your specifications. Complete understanding of the end-use of the sheet or strip you order is a rigid requirement of J&L production. You can depend upon J&L products to fit your production line.

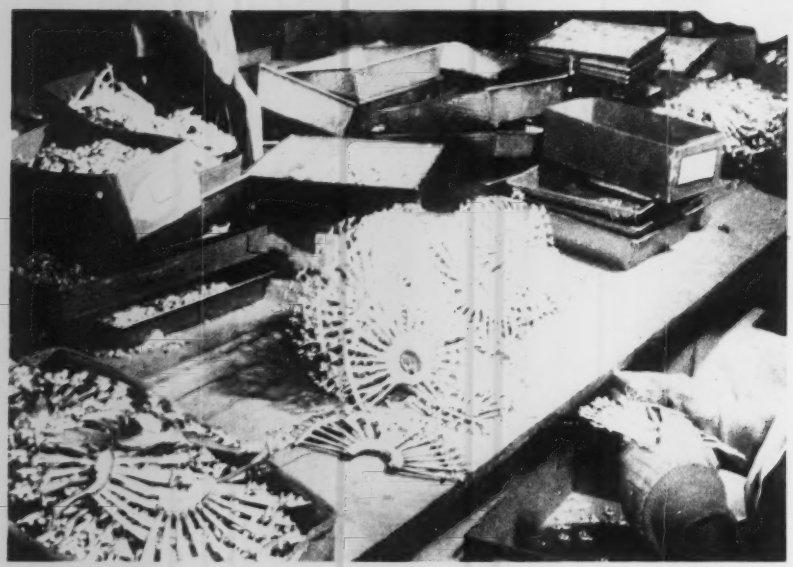


J&L SHEET AND STRIP STEEL

J&L STEEL

JONES & LAUGHLIN STEEL CORPORATION

PITTSBURGH



Wide World

Castings To Wear

These aren't starfish or artificial flowers in spite of the resemblance—they are white metal castings which will soon be costume jewelry. The scene, taken in the Henry Bogoff factory in Chicago, shows the castings just after they have been stripped from rubber molds. After cleaning they will be given a rhodium finish

manufactured by A. O. Smith Corp., Milwaukee. The line includes welding electrodes, machines and accessories.

Reynolds Appoints Agent

Reynolds Metals Co., Louisville, appointed Kasle Steel Corp., Cleveland, as a distributor of its mill products, such as flat and coil sheet, wire, rod, bar, tubing and extruded structural shapes.

Clark To Lease Equipment

Clark Equipment Co., Buchanan, Mich., manufacturer of industrial fork-lift trucks, towing tractors, straddle carriers and related materials handling equipment, established a low-cost equipment-leasing program to operate through its dealers on a national basis. The program is not intended to promote the leasing of equipment in preference to outright purchase.

The company revamped its dealer organization in the East to handle its Ross straddle carriers and fork-lift truck lines. These dealers include Materials Handling Inc., Pittsburgh; Fallsway Spring & Equipment Co., Baltimore; C. E. Reutter Corp., New Haven, Conn.; Rushmore, Weber & Case Inc., Latham, N. Y.; Brodie Industrial Trucks Inc., Malden, Mass., and Buffalo.

Latrobe Opens Warehouse

Latrobe Steel Co., Latrobe, Pa., producer of tool steels, opened its tenth warehouse at 741 Ramsey Ave., Hillside, N. J. The facilities replace the company's former sales office at 40 West 40th St., New York. W. J. Kennelly, who managed the New York office, will serve as district sales manager of the Hillside office and warehouse.

A feature of the "open-house" party, held to celebrate the opening of the warehouse, was the showing of a 16-mm sound Kodachrome motion picture entitled "The Heart of the Matter." The picture was filmed for the most part at the company's mill at Latrobe.

Kling Buys Pope Machine Co.

Kling Bros Engineering Works, Chicago, maker of steel fabricating machinery, purchased Pope Machine Co. Inc., Seattle, maker of plate bending rolls. The Pope plant will continue to operate in Seattle as a subsidiary of Kling. Officers of Pope Machine are Arthur H. Heist, president; W. C. Pope and C. W. Kling, vice presidents; Alfred G. Kling, secretary and treasurer; L. W. Sistig assistant secretary and general manager.

Installs New Type of Furnace

A new type of slab heating furnace, which can heat up to 70 tons per hour of stainless, silicon, or carbon steel from room temperature to 2275 F, has just been put into operation by Allegheny Ludlum Steel Corp.'s plant at Brackenridge, Pa.

The furnace, designed and erected by Salem-Brosius Inc., Pittsburgh, heats slabs from 5 to 9 in. thick in lengths up to 17 ft 3 in. This pusher-type furnace differs from conventional slab heaters in that heat is applied through burner ports located along the sides and at the discharge end of the furnace, rather than just through the discharge end. This makes possible faster, more uniform heating.

Slabs are charged sideways in a continuous line through the furnace chamber. As each new slab is pushed into the furnace, a conditioned slab is discharged for rolling or further processing. The furnace is 107 ft long and can be fired with either gas or oil.

National Can Expanding Plant

National Can Corp., New York, will start work soon on a new pier and a major expansion of its plant facilities at Baltimore. Proposed additions will total more than 200,000 sq ft. Its present plant contains 246,000 sq ft. S. R. Hiner Sr. is plant manager.

GM Builds in Massachusetts

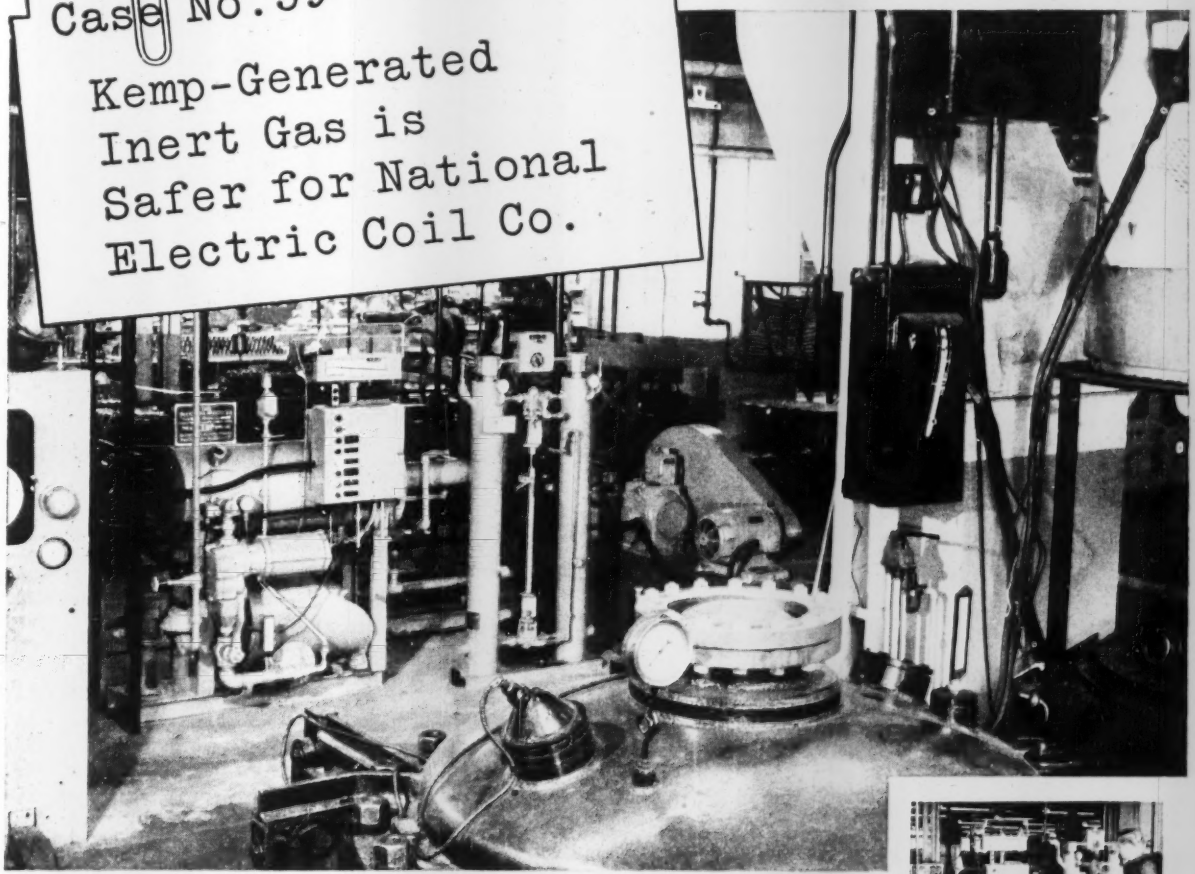
General Motors Corp., Detroit, has broken ground at Dedham, Mass., for a 26,000-sq-ft training center, reports the New England Council. Its eight shop classrooms will "tune up" 5000 GM dealer mechanics each year.

RFC Takes Over Body Works

Mifflinburg Body Works Inc., Scranton, Pa., has become the property of Reconstruction Finance Corp. The firm, operated by the American Bowling & Billiard Corp., was ordered sold in a U. S. mar-

Case No. 59

Kemp-Generated Inert Gas is Safer for National Electric Coil Co.



How National eliminates danger of explosion . . . cheaply and conveniently

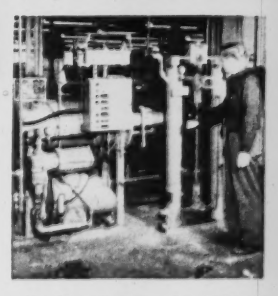
National Electric Coil Co., Columbus, Ohio, impregnates electric coils and windings by forcing in a hot sealing compound with inert gas under pressure. Formerly, the Company used air under pressure, but this created an explosion hazard. National then switched to CO_2 generated by melting dry ice. Although this decreased the danger factor, it was an extremely expensive operation and very inconvenient. To modernize this process and cut costs, National installed a Kemp Gas Generator, Model MIHE.

Kemp Solved the Problem—and More

Now National's Kemp installation delivers a completely satisfactory inert—eliminating any danger of explosion. And it delivers it at a *much lower cost* than the former generating method. In addition, Kemp supplies the gas at the rate required, plus a reserve for storage. As for convenience, the company considers their unit entirely automatic—it is practically never touched. According to Mr. D. E. Stafford, Chief Engineer, "It just sits there and operates."

Kemp Can Solve Your Problem Too

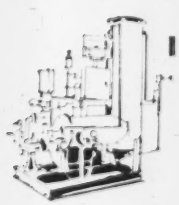
Every Kemp Generator is engineered for fast starting, easy operation that saves both *time* and *money*. Kemp equipment delivers a chemically clean inert at a specific analysis . . . without fluctuations regardless of demand. And every Kemp design includes the latest firechecks and safety devices. For convenience, safety, and cleaner, more dependable gas—specify Kemp.



Mr. Wm. C. Graessle, of the engineering department, checking the operation. Generator features the Kemp Carburetor, part of all Kemp equipment, to deliver complete combustion . . . without waste, without tinkering.

For more complete facts and technical information, write for Bulletin I-10 to: **C. M. KEMP MFG. CO., 405 East Oliver Street, Baltimore 2, Md.**

KEMP OF BALTIMORE



INERT GAS GENERATORS

CARBURETORS • BURNERS • FIRE CHECKS
METAL MELTING UNITS • ADSORPTIVE
DRYERS • SINGEING EQUIPMENT

SOMEDAY . . . *it will be for real!*

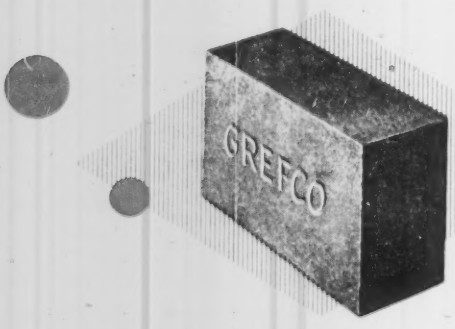
Building with blocks is as much a part of a young boy's life as baseball will be in his teens. Blocks—one on top of the other—to satisfy the typically male urge to create.

As the years roll by, this boy will go on to build bridges or buildings, to make his career in the laboratories of chemical research—or to watch steel being born from ore and earth.

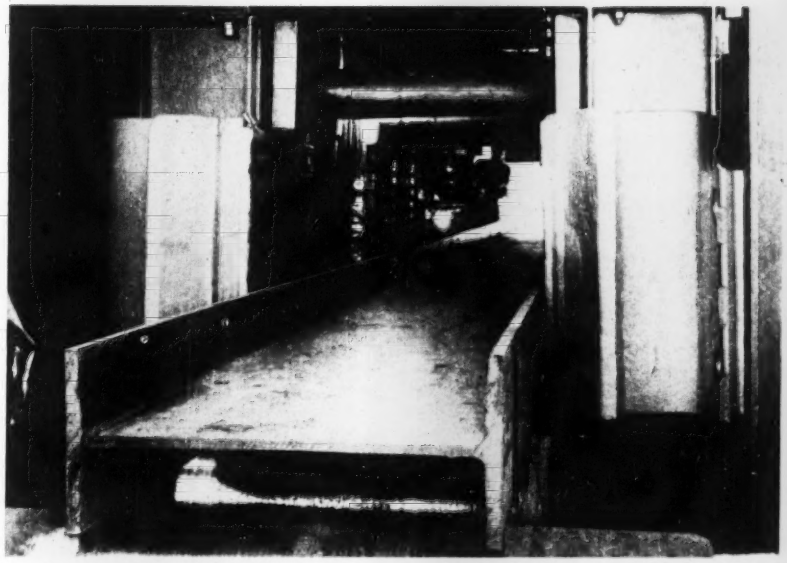
Whatever his future, there will be refractory brick to help him do his job. Blocks of brick to line the furnaces and heat containing vessels—in virtually every step of industry.

There would be no processed raw materials, no production, no living such as we know it but for refractory products which Grefco furnishes in quality and quantity to keep the nation on the move.

To the boy above, a very Merry Christmas and a great many Happy and Prosperous New Years. In his hands lies the future of America.



GENERAL REFRACTORIES COMPANY
Philadelphia



Steelways

Gag Straightens Structural Beam

A structural beam is shown being straightened in a machine that is usually called a "gag." This tunnel-like machine has movable blocks along its side that are controlled by air pressure. The operator moves the beam along the tunnel on powered rollers. Then, by manipulating controls, he presses the blocks against it at strategic spots to take out the bends. This takes a good eye and steady hand

shal's sale to satisfy a judgment of a half million dollars held by the RFC. The money was due on an unpaid loan.

J & L Opens Atlanta Plant

Jones & Laughlin Steel Corp., Pittsburgh, opened its galvanized ware plant at 1280 Chattahoochee Ave., Atlanta, on Dec. 4. The plant has 100,000 sq ft of floor space and is equipped with the latest in fabricating machinery, including blanking and forming presses, punch presses, shears, corrugating rolls, a double seamer, bail-making machines and a hot-dip galvanizing department. Eugene L. Brintley is plant manager.

Iron Ore Group Fills Office

Lake Superior Iron Ore Association, Cleveland, appointed Hugo E. Johnson as a vice president, effective Jan. 1. Mr. Johnson, a research engineer in the iron and steel industry since 1925, has been assistant manager of the Project Development group of the Battelle Memorial Institute, Columbus, O., for the last five years. Previously he was associated with Youngstown Sheet & Tube Co. and United States Steel Corp. in research and engineering positions.

Flight Refueling To Build

Flight Refueling Inc., Danbury, Conn., manufacturer of equipment for refueling of planes while in flight, has obtained 26 acres of land adjacent to Friendship Airport in Baltimore as a site for a plant to which its present operations will be transferred. The plant will contain about 60,000 sq ft.

Youngstown Firm Expands

Roll Formed Products Co., Youngstown, added 24,000 sq ft of floor space to its plant. The addition houses new, automatic polishing and degreasing facilities and new bending equipment. The company designs, forms and mass-produces shapes from ferrous and nonferrous metals.

Ampco Metal Names Agents

Ampco Metal Inc., Milwaukee, appointed as its distributors Production Materials Co., St. Paul; Guilford Welding Supply Co., Baltimore; and General Distributing Co. Inc., Great Falls, Mont.

Porter Acquires Firm

Purchase of Alloy Metal Wire Co. places H. K. Porter Co. Inc. in wire drawing field

H. K. PORTER CO. INC., Pittsburgh, acquired Alloy Metal Wire Co., Prospect Park, Pa. The latter company produces stainless and alloy steel wire, rods and strip for use principally in the electrical, electronic and chemical fields. Operations will continue as Alloy Metal Wire Co., division of H. K. Porter Co. Inc.

This acquisiton, in line with Porter's continuing policy of diversification, places the company in the wire drawing field in addition to its present operations in rubber, steel, electrical equipment, forged steel fittings, hydraulic equipment and wire rope.

Diversification—"It is the Porter company's policy," says T. M. Evans, president, "to expand and diversify its operations whenever a favorable opportunity presents itself so that it will not be dependent on any one industry."

Porter divisions now include Quaker Rubber Corp., Philadelphia; Connors Steel Division, Birmingham; Buffalo Steel Division, Tonawanda, N. Y.; Delta-Star Electric Division, Chicago; Hinderliter Tool Co. Division, Tulsa, Okla.; Leschen Wire Rope Division, St. Louis; and Watson-Stillman Co., Roselle, N. J.

Extends Engineering Service

Fischer & Porter Co., Hatboro, Pa., created a Special Products Division for development of special instruments and instrument components to contract specifications. Edward H. Muhleisen is manager of the division.

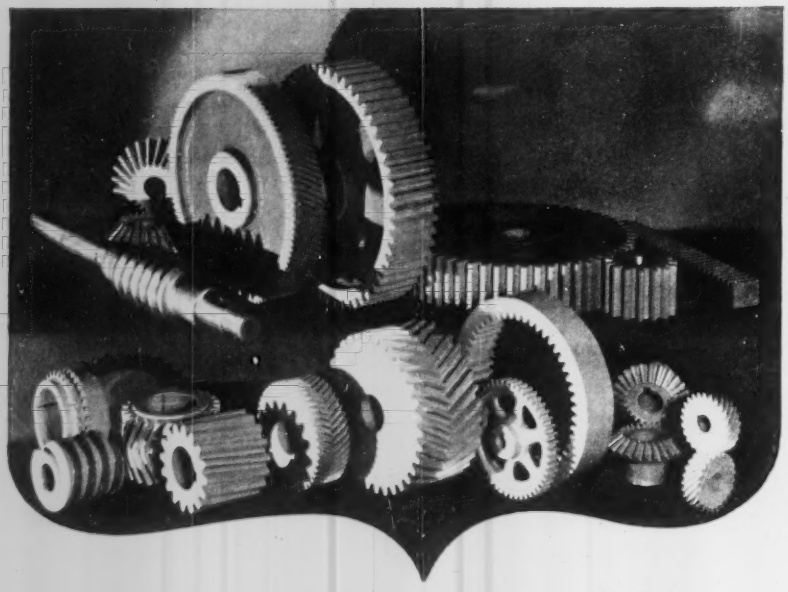
Lyon Renovates Plant

Lyon Metal Products Inc., Aurora, Ill., formally opened its renovated plant in that city. H. B. Spackman, president, says the company spent $1,250,000 in 18 months in the improvement program. The entire project was accomplished without serious interruption to production and included such major changes as relocation of most departments, conversion of steel

INDUSTRIAL GEARS

for every purpose from

an ounce **to 20,000 lbs.**



• Whether you require Spur, Spiral, Herringbone, Bevel, Mitre, Internal or Worm Gears—Worms or Non-Metallic Pinions... here they are... the finest made. For over a half century Horsburgh & Scott has specialized in making gears that represent the best in engineering design, accurate workmanship and fine materials. Economical too, for they are standardized and built to endure. With a complete line of all types and sizes . . . here's one source for all gears and gear products.

THE HORSBURGH & SCOTT CO.

GEARS AND SPEED REDUCERS

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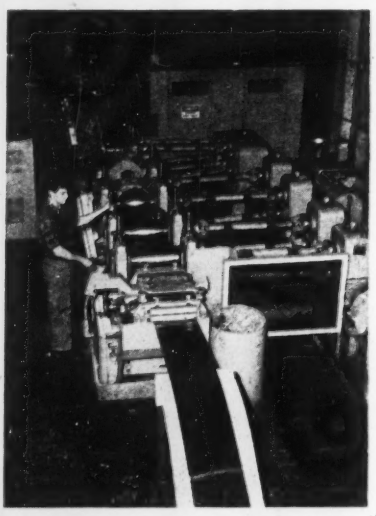
Send note on Company Letterhead for 488-Page Catalog 49



Tubing Rolls Through Mill

High-speed production of induction welded aluminum tubing is under way at Trentwood Works, near Spokane, Wash., of Kaiser Aluminum & Chemical Corp., Oakland, Calif. Speeds up to 120 fpm are possible on equipment made by Yoder Co., Cleveland

processing from flat sheets to coil and extensive changes in materials handling methods.

Builds Silicone Parts Plant

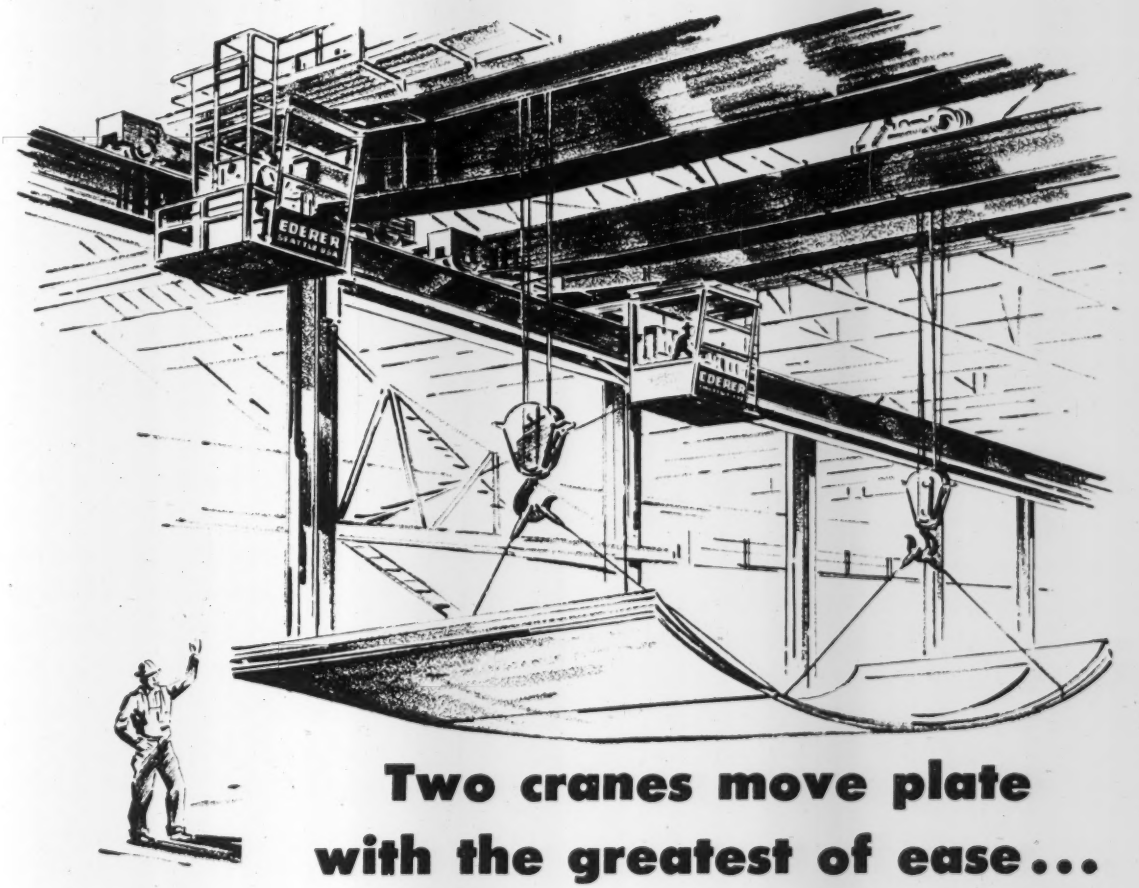
Construction of a plant for the fabrication of precision silicone parts is under way adjacent to the main plant of Goshen Rubber Co, Inc., Goshen, Ind. Facilities in the new plant include presses, mills, extruders, curing ovens and trimming equipment.

Carboloy Names Distributor

General Electric Co.'s Carboloy Department, Detroit, appointed Mahar Tool Supply Co. Inc., Saginaw, Mich., as distributor of its line of standard cemented carbide tools and blanks, carbide-tipped masonry drills and diamond wheel dressers.

Tool & Die Plant Opens

W. A. Sheaffer Pen Co., Ft. Madison, Iowa, has embarked on a new operation with the opening of a $1.5-million tool and die plant in that city. Its Tool & Die Division plant is a complete facility for handling a wide variety of tools, dies and fixtures or special



Two cranes move plate with the greatest of ease...

In the plant where these two 10-ton, 70-foot-span cranes are operating, there is frequent need for the "tandem" operation of both cranes in handling large size steel plate. At other times the two cranes operate independently. To fit the specific requirements of this operation, EDERER "job-engineered" the pair of cranes with synchronized speeds for the dual operation.

This designing and building cranes to the exact materials handling requirements of industry has made EDERER cranes perform with extra efficiency and economy. EDERER—one of the largest crane manufacturers in the West—can "job-engineer" a crane to your requirements.

Write for Crane Bulletin CR-500

240C53

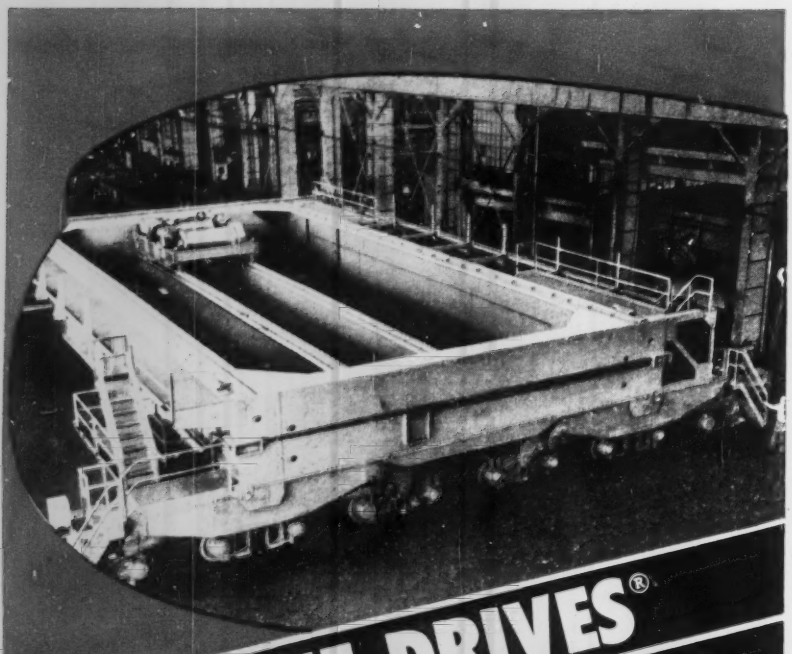
EDERER

CRANES

EDERER ENGINEERING COMPANY • 2935 First Avenue South • Seattle 4, Wash.

Export Division: 301 Clay Street, San Francisco 11, Calif.

OVER 50 YEARS "JOB-ENGINEERING" CRANES FOR INDUSTRY



Ten CONE-DRIVES® give compact power to steel mill crane

Morgan Engineering Company's 350-ton, 76-ft.-span ladle crane bridge features six individual 65-hp. motor drives that avoid line shaft designs.

Key to the success of this design incorporating parallel drives is the 12-in. center distance, 12 1 Cone-Drive gearset in each drive that cuts space requirements, resists shock loads and provides ample safety factor for smooth, rugged, long life operation.

Cone-Drive gearsets are also included in the drives for the 200-hp. main trolley hoists and auxiliary 20-ton and 60-ton hoists.

This is another example of the trend to Cone-Drive gearsets and standard speed reducers in steel mill equipment. Designers and users alike benefit from their long life and high capacity in less space at lower cost.

ALL TEETH IN CONTACT

Standard double-enveloping Cone-Drive gearsets and reducers have greater contact per tooth, more teeth in contact, increased load capacity, greater shock load capacity, longer life, lighter weight and lower overall cost.

Ask for "Cone-Drive Gears at Work in Industry" (Bulletin No. CD-173) — case histories.

CONE-DRIVE GEARS
Division Michigan Tool Company
DOUBLE ENVELOPING GEAR SETS & SPEED REDUCERS
7171 E. McNichols Road • Detroit 12, Michigan

equipment for any industry, says W. A. Sheaffer II, president. General manager of the division is A. A. Zuber, formerly vice president and a director of Carver Pump Co., Muscatine, Iowa.

Insuline Corp. Opens Plant

Insuline Corp. of America, Long Island City, N. Y., is taking over a former Textron mill at Manchester, N. H. Company will use six acres of space to boost output of home, radio and car antennas. Equipment is already set up, and the plant's first radio-TV production has started.

Airpax Building Addition

Airpax Products Co., Baltimore, manufacturer of converters and rectifiers for electronic laboratories, is erecting a plant addition containing about 4000 sq ft. The addition will bring the company's floor space up to 15,000 sq ft.

Allis-Chalmers Names Agent

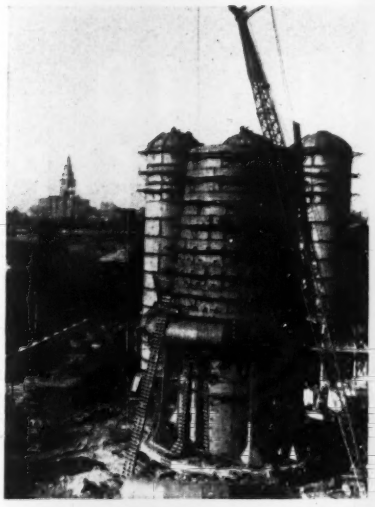
General Machinery Division, Allis-Chalmers Mfg. Co., Milwaukee, appointed Portland Electric & Plumbing Co., Portland, Oreg., as distributor for its motors, controls and transformers.

American Can Opens Plant

American Can Co., New York, officially opened its container-making plant in Plymouth, Fla. It is a multimillion-dollar installation.

Tubing Firms To Merge

American Metal Products Co., Detroit, and Tube Reducing Corp., Wallington, N. J., will merge, subject to approval of stockholders. The surviving corporation, American Metal Products Co., will operate both businesses with separate corporate identities. No changes in present managements are contemplated. American Metal manufactures electric welded tubing for their use in fabricating automobile seat-frame assemblies, axle housings and similar products. Tube Reducing produces close-tolerance, compression-sized seamless tubing for a wide variety of end uses. A combined facility on the West



Furnace Gets Bustle

American Steel & Wire Division's new blast furnace is shown having her bustle affixed round her middle. When completed early next summer, she will be 229 ft high. Three heating stoves, 114 ft high, rise behind the furnace at Central Furnaces & Docks plant of this U. S. Steel unit in Cleveland

Coast is being given active consideration.

Association Re-elects Hershson

Morris Hershson, president, United States Barrel & Drum Corp., New York, was elected president of National Barrel & Drum Association Inc., Newark, N. J.

Pope Machinery Names Agent

Pope Machinery Corp., Haverhill, Mass., appointed Bearings Inc., Cleveland, as representative for its line of precision grinding spindles.

Welding Firm To Expand

Taylor - Winfield Co., welder, Warren, O., plans to build a $100,000 plant addition to provide room for more equipment.

Aircraft Firm Leases Space

Aircraft Armaments Inc., Baltimore, leased 6000 sq ft of space at 4003-07 Seven Mile Lane. This makes the fifth separate location, providing the company with a combined space of 33,000 sq ft in Baltimore.

an ACCO product

ENDWELDUR SLING CHAINS

Small AMERICAN Sling Chain Lifts 25,000-lb Load Safely

• This ACCO *Registered* 4-leg, Endweldur 125 Sling Chain is relatively light in weight yet it has sufficient strength to lift an expensive 25,000 lb die with safety.

This desirable combination of great strength and light weight is the result of scientific heat treatment of the alloy steel used in this modern chain and the proper combination of engineered hooks and pear shaped links that make up a complete ACCO *Registered* Sling Chain assembly. This gives you a chain that is easy to handle and safe to use even where working temperatures run up to 1000°F.

Endweldur 125 ACCALLOY Sling Chains come in sizes from $\frac{1}{4}$" to $1\frac{1}{4}$" with working load limits to 57,500 lbs per leg, so there is a size for just about every lift you have. Other AMERICAN Sling Chains are available in Endweldur 85 made of carbon steel, heat treated . . . also stainless steel, monel metal and silicon bronze . . . and wrought iron.

AMERICAN has a sling chain for your every need. See your distributor or write our York, Pa. office today for the ACCO Registered Sling Chain Catalog.

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AMERICAN CHAIN DIVISION
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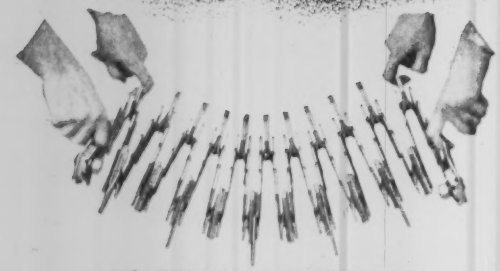
American Chain

SAVE UP TO 1/6 ON UP-KEEP

Periodic Tightening of Clamping Nuts Eliminated—With EC&M Tab-Weld Plate Resistors

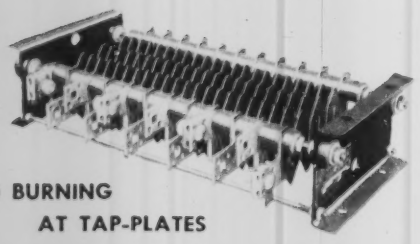
1. INSPECT MOTOR
2. CHECK CONTROL PANEL
3. ADJUST BRAKE
4. TEST LIMIT STOP
5. EXAMINE MASTER SWITCH
6. TIGHTEN RESISTOR NUTS

EC&M TAB-WELD Plate Resistors provide the opportunity to reduce upkeep by a new construction which has shown excellent operating results.



NO BURNING AT GRID-EYES

This construction brings grid-eyes into intimate contact, eliminating the electrical connectors previously required between grids. Spot welding the tab-ends of the grids maintains the intimate contact and provides a continuous path without depending on the pressure of the end clamping nuts. Burning at tap-plates is also eliminated by spot welding the tap-plates to the ends of the mated grids.



NO BURNING AT TAP-PLATES

In addition to elimination of trouble in concealed areas of the sections, EC&M TAB-WELD Plate Resistors have other cost-saving features. These are: stabilized resistance value, simplified tap-shifting with several tap-plates permitting convenient adjustment for best motor operation, metal tap-plate identification tags, corrosion-resisting qualities, etc. *Write for Bulletin 942 giving complete details.*

A reduction in preventive maintenance is a plus value — specify EC&M TAB-WELD Plate Resistors.

THE ELECTRIC CONTROLLER & MFG. CO.
2698 EAST 79TH STREET • CLEVELAND 4, OHIO

STEEL

December 21, 1953

Technical Outlook

BRAZING FUTURE— The process that goes back to antiquity, brazing, is apparently just beginning to move into its heyday. With the principle extended to include aluminum and magnesium, the American Welding Society is soon to release an exhaustive manual covering all brazing processes for virtually all metals. Some idea of how far the process has come: Brazing filler metals are in use in jet engines at temperatures around 2000° F!

RADIOGRAPHY— Growing availability of sources of high specific activity plus an expected price policy on Iridium-192 by the AEC are expected to start an uptrend in thin-section radiography.

HEATING ANGLE— Heat is applied through burner ports along sides and at discharge end of new slab heating furnace installed at Allegheny Ludlum Steel Corp.'s plant at Brackenridge, Pa. It can heat up to 70 tons per hour of stainless steel, silicon steel (electrical quality) or carbon steel from room temperature to 2275° F.

IN-LINE TESTING—Hardness testers that fit into a conveyor line can make up to 800 tests an hour on a "go" and "no go" basis, according to Steel City Testing Machines Inc., Detroit.

SHAPE OF THE FUTURE— In the race to design bigger and more efficient electric furnaces for steel production, one design—the elliptical, six-electrode furnace—seems to have been overlooked. This point was brought out at the electric furnace meeting of the A.I.M.E. in Cincinnati. Such a furnace has been melting faster and at the same power output required for the slower, more modern models of today. It's the 25 year-old, 100-ton, No. 7 furnace at Timken in Canton, O. It has been predicted that such a furnace, equipped for top charging and utilizing higher powered transformers, would be faster and more efficient than any circular furnace with same rated capacity.

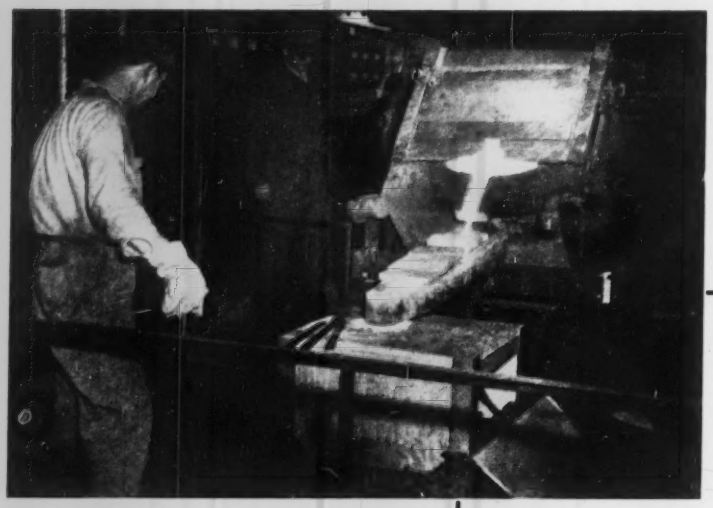
LARGE TUBES— Two tube reducing machines that can make cold-reduced tubing up to 17 inches in diameter are slated for installation next year, according to Tube Reducing Corp., Wallington, N. J. Material range: Ordinary carbon and stainless steel, soft and extremely hard nonferrous alloys.

SAVING MANHOURS—Transfer-matic for V-8 engine blocks that combines 539 operations is under construction at Cross Co., Detroit. It is 346 feet long, handles the part in seven positions and has a machining capacity of 100 parts per hour. Efficiency is said to be 100 per cent.

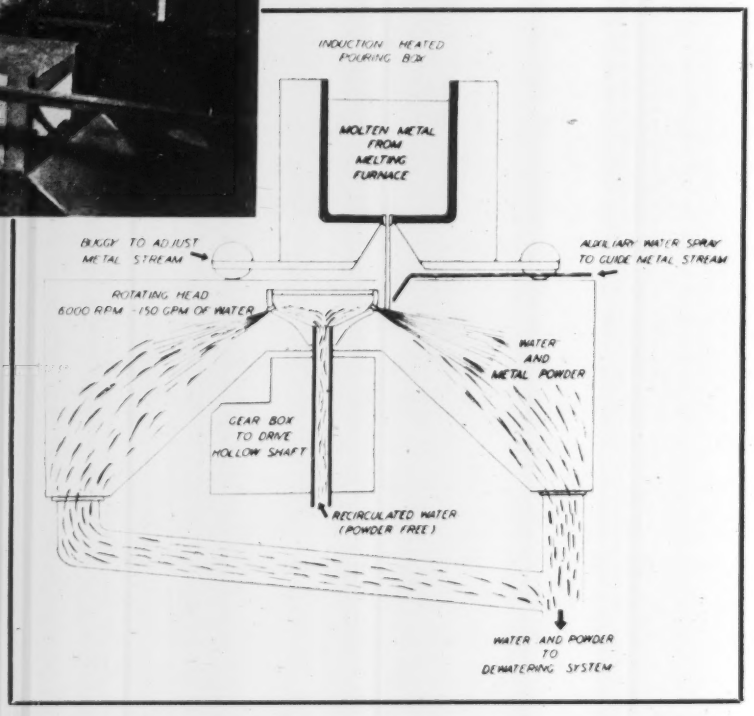
COLD WELDING—Hand tool for lap welding aluminum sheet or foil without heat, electricity, flux or chemicals has been developed by the Utica Drop Forge & Tool Corp., Utica, N. Y. Company says its Koldweld tool will handle aluminum and electrical copper in thicknesses from 0.001 to 0.040 inch or an over-all maximum thickness of 0.080 inch.

GROWING— Use of pearlitic malleable castings is on the up-grade. Minimum strengths range from 60,000 to 90,000 psi; yield points from 43,000 to 70,000; elongation values from 2 to 10 per cent. With wearing surface hardened to 55 Rockwell C, it is being used in automotive valve rocker arms.

Metalworking Outlook—p. 29 Market Outlook—p. 121



Pouring molten metal from induction melting furnace into tundish. It empties metal into the disintegrator


INDUCTION HEATED POURING BOX
MOLTEN METAL FROM MELTING FURNACE
BUGGY TO ADJUST METAL STREAM
AUXILIARY WATER SPRAY TO GUIDE METAL STREAM
ROTATING HEAD 6000 RPM - 150 GPM OF WATER
WATER AND METAL POWDER
GEAR BOX TO DRIVE HOLLOW SHAFT
RECIRCULATED WATER (POWDER FREE)
WATER AND POWDER TO DEWATERING SYSTEM

Schematic drawing of the disintegrating machine, showing the metal stream being converted into powder

Powdered Metals enter stainless stage

Stainless powders are available in grades 302-B, 316, 318, 318-Si and 410. Patented process melts and disintegrates alloy steels to achieve complete homogeneity

By W. L. BATTEN
Metallurgist
Vanadium-Alloys Steel Co.
Latrobe, Pa.

POWDER metallurgy, an ambitious and visionary junior executive in the metalworking industry, is steadily winning the confidence of his older and more experienced associates.

For example, completely alloyed steel powders have been developed to the point where they now may be obtained in commercial quantities.

Representative line of stainless powders (grades 302-B, 316, 318, 318Si and 410) is being offered by Vanadium-Alloys Co., Latrobe, Pa. Its prealloyed powders are produced by a patented process that involves melting and disintegrating alloy steels to achieve homogeneity in all powder particles.

Research — Industrial requirements for easily processed stainless steel powder defined the area and nature of the company's initial research in powder metallurgy. Previous efforts to combine iron and other metals by molding and sintering primary metal powders of desired composition were unsuccessful because excessive sintering times were required to achieve reasonable homogeneity.

One stainless steel powder was developed, but it was limited to the 18-8 type that could be sensitized and chemically disintegrated. It won only limited acceptance because of the extremely high sintering temperatures required.

How It's Made—Process calls for water disintegration of prealloyed molten metal. Steel of desired composition is melted in 1000-pound, electric, induction furnaces and transferred to a tundish (lined with zirconium silicate refractory) and heated electrically to control and maintain the temperature of the molten metal. Liquid metal flows through a small zirconia nozzle that has a hole diameter of 3/16 to 7/32 inch.

In the disintegrator, the pencil-thin stream of molten metal is blasted into powder by water jets that emerge from a hollow rotating disk through 16 nozzles placed at the outer periphery. Disk rotates at 6000 rpm. It is attached to the top of a hollow shaft through which water flows at low pressure. Centrifugal action of the revolving disk builds up sufficient pressure to supply disintegrating energy.

Mixture of water and powder is then pumped to a dewatering system a Deister classifier, Allen slime cone and a Vortrap. Most of the powder is collected in the cone, while extreme fines are collected in the Vortrap. Undesired coarse particles may be separated in the Deister classifier and discarded. Product of the cone and Vortrap (containing about 10 to 15 per cent moisture) is further dewatered in an Oliver rotating filter to about 3 to 5 per cent. It is then dried and screened to desired mesh size. Reduction and annealing treatments complete the process.

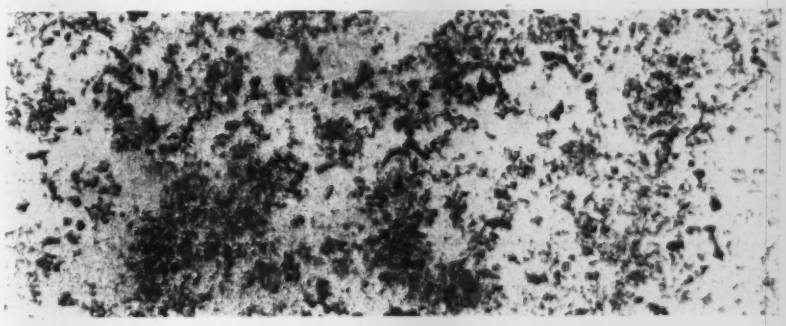
Scope—Practically any composition can be produced as prealloyed powder by this process, including carbon and alloy steels, stainless steels, tool steels, special purpose steel and high temperature alloys. Each presents different problems of production and adjustments in processing. Repeated lots of any composition must be produced before a powder can be considered a commercial grade.

Development and commercial introduction of acceptable prealloyed steel powders extended powder metallurgy to include high strength and corrosion resistant applications.

Applications—First major use

STANDARD STAINLESS STEEL POWDER COMPOSITIONS

Constituents	302B	316	318	318 Si	410
Carbon	.12 Max.	.12 Max.	.12 Max.	.12 Max.	.10 Max.
Chromium	17.00/19.00	17.00/19.00	17.00/19.00	17.00/19.00	11.50/12.50
Nickel	7.00/9.00	10.00/12.00	10.00/12.00	10.00/12.00	
Molybdenum		1.75/2.50	1.75/2.50	1.75/2.50	
Columbium			.80/1.20	.80/1.20	
Silicon	2.00/3.00	2.00/3.00	.80/1.10	2.00/3.00	.70/.90
Manganese	1.00 Max.	1.00 Max.	1.00 Max.	1.00 Max.	1.00 Max.



Particle shape of type 302-B stainless powder at x 20. This is typical of the moldable stainless steel powders

PHYSICAL PROPERTIES OF STAINLESS STEEL POWDERS

Average Values from Production Lots of —100 Mesh Powder

Vasco Type	Sieve Analysis Mesh Size	Per Cent	Compacting Pressure t.s.i.	Compression Ratio	Apparent Density gms/c.c.	Flow Time Sec.	Max. Per Cent Weight Loss in Hydrogen
302B	+ 100	3					
	100 + 140	21					
	140 + 200	25	30	1.79			
	200 + 270	15	40	1.91	2.8	28	0.35
	270 + 325	13	50	2.01			
	325	23					
316	+ 100	3					
	100 + 140	24					
	140 + 200	25	30	1.99			
	200 + 270	16	40	2.16	2.17	33	0.35
	270 + 325	12	50	2.27			
	325	20					
318	+ 100	3					
	100 + 140	17					
	140 + 200	23	30	1.93			
	200 + 270	15	40	2.09	2.7	29	0.45
	270 + 325	12	50	2.20			
	325	30					
318 Si	+ 100	3					
	100 + 140	14					
	140 + 200	21	30	1.69			
	200 + 270	20	40	1.83	2.7	32	0.35
	270 + 325	13	50	1.96			
	325	29					

TYPICAL PROPERTIES OF PREALLOYED STEEL POWDER COMPACTS

Values courtesy Keystone Carbon Co., St. Marys, Pa.

Grade	AISI 4630	AISI 4630	AISI 4630	AISI 4630
Description and Heat Treatment	1 Z 2 Annealed	Z 2 Annealed	Z 2 Water Quenched	Z 2 Oil Quenched
Apparent Density (Gms./cc)	7.4	7.5	7.5	7.5
Ultimate Tensile Strength (p.s.i.)	52,000	58,000	108,000	115,000
Elongation Per Cent in one inch	6.0	7.7	*	1.5
Yield Point in Compression (p.s.i.) 0.2% (offset)	*	*	89,000	80,000
Over-all Compact Hardness (Rockwell)	B-60	B-70	A-70 (C-39)	A-65 (C-30)
Modulus of Rupture (p.s.i.)	*	147,000	234,000	195,000
Radical Crushing Strength (ASTM "K" value — p.s.i.)	*	130,000	245,000	250,000

* No test data available at this time

SINTERED PROPERTIES OF STAINLESS STEEL POWDERS —100 MESH POWDER

Type	Compacting and Coining Pressure— t.s.i.	Sintering and Re-sintering Temperature °F.	Tensile Strength p.s.i.	Elongation Pct., in/in.	Final Density gms./c.c.
302B	10-0	2200	25,500	8	5.59
	10-10	2200-2200	54,000	20	6.23
	10-0	2300	41,500	15	5.90
	10-10	2300-2300	71,500	26	6.49
	*50-50	2300-2300	87,000	32	6.79
316	10-0	2200	25,500	8	5.77
	10-10	2200-2200	46,500	18	6.37
	10-0	2300	39,500	13	6.02
	10-10	2300-2300	60,500	20	6.60
	*50-50	2350-2350	76,000	31	7.00
318	10-0	2200	20,500	2	5.89
	10-10	2200-2200	35,500	4	6.53
	10-0	2300	27,000	7	5.91
	10-10	2300-2300	49,500	16	6.64
	*50-50	2350-2350	67,500	28	7.01
318 Si	10-0	2200	25,500	3	5.61
	10-10	2200-2200	39,500	5	6.20
	10-0	2300	45,000	7	5.95
	10-10	2300-2300	62,000	16	6.50
	10-10	2350-2350	92,000	31	7.00
	*50-50	2350-2350	91,000	36	7.15

Sintering and re-sintering times 45 minutes at temperature

*Optimum properties for each grade using 100 mesh powder

for stainless steel powder was small driving arms in intermediate gear trains of water meters. These parts must operate up to 50 years and require a material that is resistant to wear and corrosion in a variety of waters. Type 316 stainless steel powder (subjected to a passivation treatment after sintering) is quite suitable.

Powdered stainless steel parts are replacing drawn stainless tubing for sleeve bearings and bushings in industrial meters that measure nitric acid or other highly corrosive liquids. In this application, one of the big problems was the seizure of the 18-8 stainless steel shaft if the bushing was made of the same wrought material.

When austenitic stainless steel parts are made from wrought or cast material, normally there is a tendency for mating parts to weld together. Their hardness or structural differences cannot be adjusted sufficiently to prevent this failure. Bushings made from prealloyed stainless steel powder resist seizure and have better wearing qualities probably because of unique structure and lower density of the powder compacts.

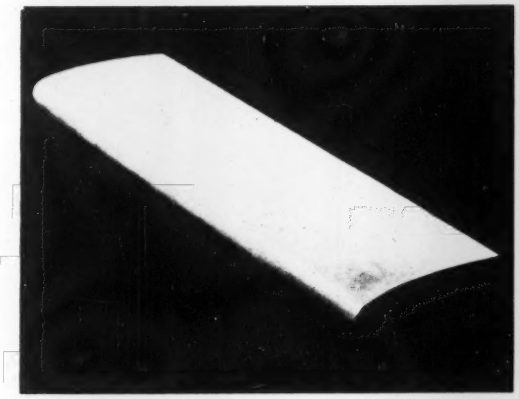
Other successful applications of stainless steel powder parts: Guides for fishing rods, cigarette lighter cams, small gears, levers and bearings.

Filters—Industrial filters mark the second most important application of stainless steel powder. A number of analyses are required to satisfy varying corrosion conditions encountered.

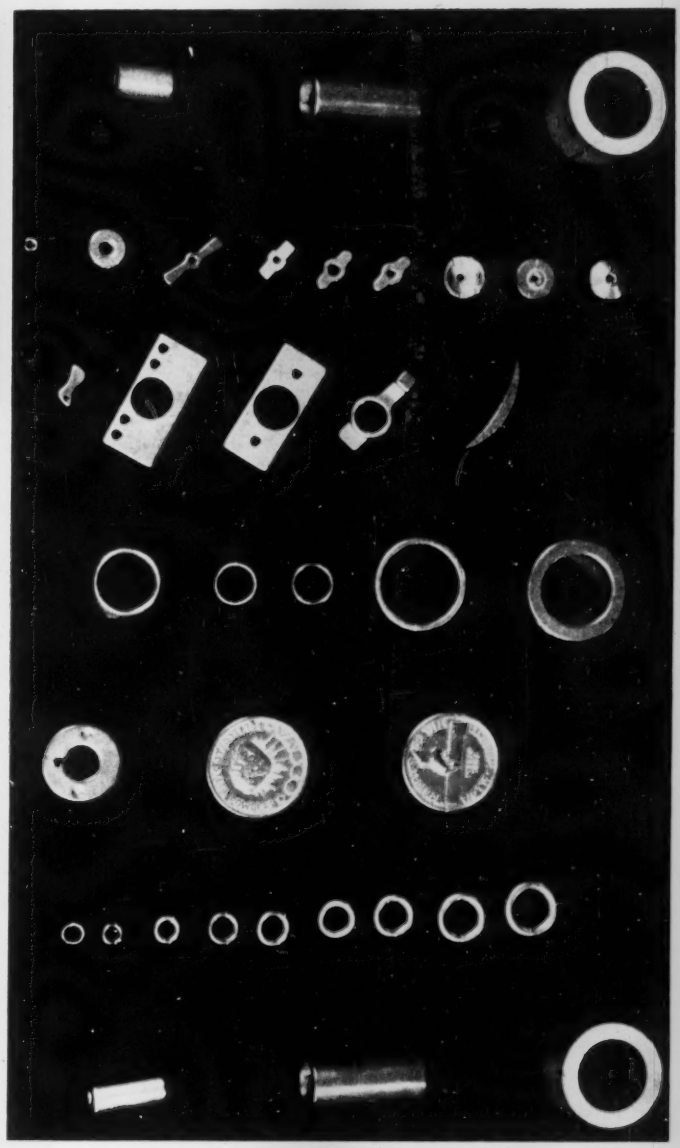
In general, filters are produced from types 302 and 316 stainless steel powders. Because some fabrication techniques involve welding and the need for prevention of intergranular corrosion in service following welding, columbium or titanium additions frequently have been made to type 316.

Others—De-icer sections for critical aircraft control surfaces are a new and promising application of porous sheets made from stainless steel powder. Sheets permit flow of warm air or de-icing fluid through the aircraft skin and effectively prevent icing.

Type 302-B stainless steel powder is used as a raw material for

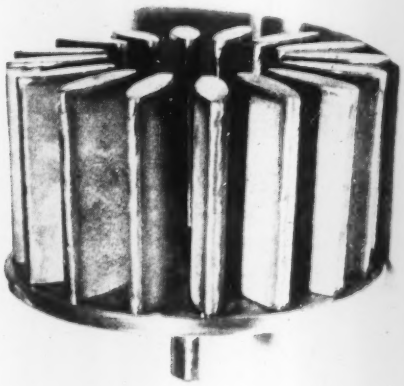


De-icer sections for critical aircraft control surfaces offer promising use for powder metal sheets



Typical production parts include bushings, water meter and machine components, medallions, fish pole parts

Bayonet cluster used on discharge manifold to filter gases—illustrates flexibility of fabrication offered



the production of stainless steel flake. This flake, when mixed with the proper vehicle, has provided excellent protective paint coating for structures and industrial units subjected to an atmospheric corrosion environment. Stainless steel powder also has been employed for spray welding of protective coatings on industrial parts requiring either corrosion or heat resistance.

Properties — These prealloyed stainless powders have gained acceptance because of their excellent green strength, wide sintering range and outstanding mechanical properties obtained with single pressing and sintering.

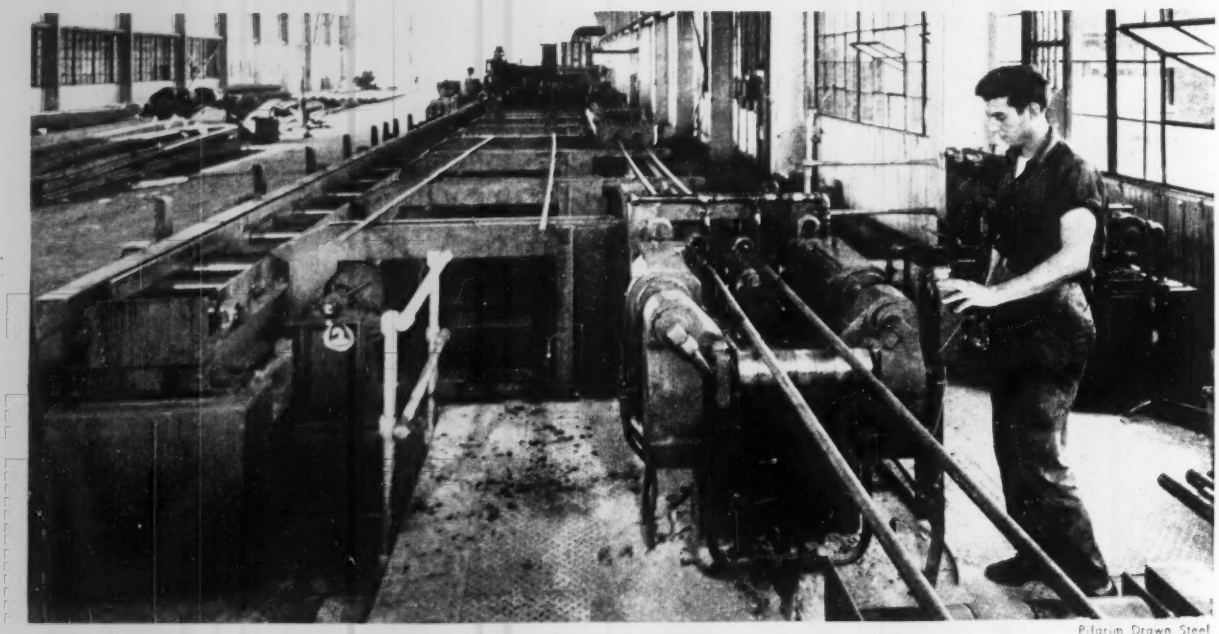
Contributing to easy working are low oxide content, irregular particle shape and ideal particle size distribution. High tensile strengths are possible with a minimum of working, and toughness (measured by per cent elongation) is far greater than is normally obtained in processing metal powders.

Outlook — Besides stainless steels, the company produces a number of AISI and SAE alloy steels as prealloyed powder. Like the standard AISI 4600 series steels, they are aimed at those parts requiring higher strength than obtained with iron powder.

Of course, manufacture of gears is ideally suited to the powder metal process, because close tolerances and cost savings are possible. High strength gears made from prealloyed powders have uniform heat treated properties.

Many small die cavities are being formed by the powder process. As this practice is increased to include larger dies, an alloy steel powder will be necessary to develop desired properties by heat treatment.

Production of small intricate tools from high-speed steel powder compositions also is foreseen



Pilgrim Drawn Steel

Lubricant used here is a granulated powder that includes high melting point waxes and fats in combination with a colloidal pigment. It replaces lime

Coating Paves Way

FOR DRAWING SPEEDUP

By replacing conventional lime coating practice with a dry, thin-film lubricant, one plant triples production with 3-die draw benches. Speeds go up to 150 fpm

A COLD reduction bar plant reports it has been running its 2-die draw benches at 90 to 100 fpm for the past three years. More recently, its 3-die draw bench has hit speeds up to 150 fpm.

Secret: Instead of following the conventional lime coating practice, company substituted a dry, thin-film lubricant coating called Houghto-Draw 3119, product of E. F. Houghton & Co., Philadelphia.

Lubricant is a granulated powder including high melting point waxes and fats in combination with a colloidal pigment. Also containing extreme pressure and lubricity additives, it is held together in a matrix of regenerated cellulose that provides adhesive properties.

Triple Play—In the plant mentioned, McKay 3-die draw benches (plus the new coating) triple production of same make 2-die benches using lime coatings. On the latter benches, new coating adds as much as 40 fpm to production.

Plant draws hex, round and square bar stock in diameters ranging from $\frac{5}{8}$ to 3 inches. Flat stock is drawn in sizes up to a peripheral circumference of 8 inches. Average reduction on all sizes is 1/16 inch in thickness, 1/32 inch in width.

Carbide insert dies are used on all standard bar sizes and shapes. Typical die for round stock has a blended entering angle of 30 degrees, back relief of 40 degrees. Bearing length is from $\frac{1}{8}$ to $\frac{1}{4}$ inch long.

Forward Extrusion—The 3-die draw benches reach speeds up to 150 fpm without chattering, die pick up, scoring or scratching of drawn surfaces. Excessive frictional heat is not developed.

Here bar is not pointed for insertion through die. Short section of bar end is hydraulically pushed through die as in a forward extrusion. Extruded section is then gripped and remainder of bar is pulled through die at high speed. (If other lubricants crack or spall off during initial extrusion, dies pick up metal and work is scratched.)

General Recommendations—Hot rolled bars or rods are pickled in a hot solution of 10 per cent sulphuric acid. One pound of pickling inhibitor (Acitrol No. 3129) is added to 400 pounds of concentrated acid.

After a rinse, work is immersed in a tank containing 10 to 12 ounces of Houghto-Draw No. 3119

per gallon of water. Bars should remain in solution (kept at 165 to 175° F) for about 5 minutes.

Draining and air drying follow. External heating or baking are not required. Residual heat in bars dries film coating under most humid conditions. Adherent, semi-waxy film (about 0.001 inch thick) remains on bars, which may be drawn on drying or stored for several days without rusting or deterioration of the coating. Film is not hydroscopic.

Drawing—During draw, Cutmax 320 is circulated over bar stock at entrance to dies. It is a light viscosity, high film strength drawing oil with properties tied to the chemical and physical properties of the base flim.

This auxiliary lubricant is highly effective in removing heat from dies, die holders, bar stock and that produced by deformation of metal.

Its polar active properties promote rapid wetting out of the die surfaces and the film of primary lubricant on the rod. Power requirements are reduced by a high degree of slip between the coating and carbide die surfaces.

Duplex lubricating film also has a low coefficient of friction. Its stability is maintained under high deforming pressures, and the abrasive tendencies of lime coats plus mineral oil are avoided.

Dividends—Drawn bars have a bright, polished appearance, instead of the dark, dull surface obtained on lime-coated stock. Smooth surfaces are free from scratches and scoring.

Because new coating is clean to use, working conditions are improved. There is no lime dust or accumulation of lime dripping around the coating tank. Presence of a foam blanket does away with the disagreeable cloud of steam found around a boiling lime tank.

Tanks and steam coils do not need frequent cleaning. There is no buildup of hardened coatings or sludges in the tank or on steam heating coils.

Operation—Solution can be used indefinitely with required additions to compensate for drag out losses. In the plant previously discussed, tank was emptied one time (at end of 16 months for tank inspection) in three years. Present charge has been in over 20 months.

Cost of heating solution averages half the cost of heating a lime-coating installation. Saving is due to lower temperature of operation and absence of heat insulating buildup on heating coils.

Heatup time is faster. After weekend shutdown, one heating coil gets 5000-gallon tank to operating temperature in 1¼ hours. Using lime, it took two steam coils three hours to accomplish this.

One Time—Only one immersion of stock is required to get an adherent coating. With lime, redipping is frequently needed, especially after coated bars are exposed to humid air.

Concentration is readily controlled by a simple titration method. Daily additions of ½ to 1 pound of trisodium phosphate per 1000 gallons of solution are usually needed to keep pH in desired range above 9.5.

Suggested Coating Practice

Hot rolled bars should be pickled and free from scale.

Thorough rinsing after pickling is required. Effective rinse: High velocity water spray from a nozzle while work is raised and lowered over spread racks.

Dip tank rinse can be used if water is changed after each 10 tons of steel processed. Running tank rinse is not satisfactory, unless large volumes of fresh water constantly flow into tank.

While the solution will tolerate some acid carry over, excessive amounts will interfere with uniform dispersion of pigment and waxes in solution.

After rinsing, sling load of bars is immersed in lubricant tank over spread racks on bottom to split up load for uniform coating.

Recommended operating temperature of solution is in the range 165 to 175°F.

Bars remain in heated solution for about 5 minutes, then drained and dried. Drying time can be speeded if coated bars are spread over racks to expose all surfaces.

Residual heat in bars dries to required type of film. Baking or external heating are not required.

Bars can be drawn immediately while still retaining some heat or can be stored for reasonable length of time and drawn without recoating.

Type of Equipment

Brick, steel or wooden tank can be used.

Heating should be with steam coils mounted on long sides of tank.

Agitation of the solution is required. Recommended method: Circulation pump with outlet connected to a 1½-inch pipe along bottom center of tank. Series of holes is drilled into sides of pipe, pointing towards tank sides. Results: Effective circulation of solution across bottom of tank and up and around heating coils.

Small pet cock is placed on inlet side of solution pump to bleed air into pumped solution. Air controls the depth of foam blanket on surface of solution. Foam blanket prevents steam vapor from rising from surface of heated solution.

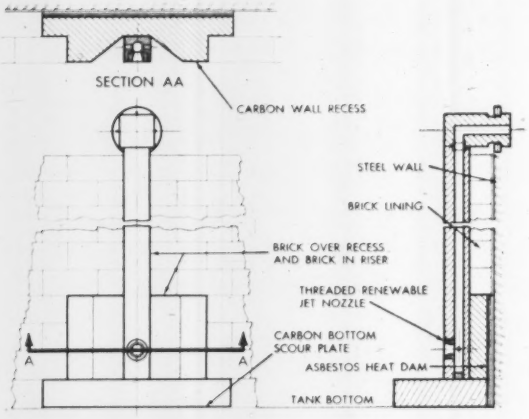
Spread racks should be placed in the bottom of solution tank so sling load of pickled and rinsed bars can be opened up for uniform coating.

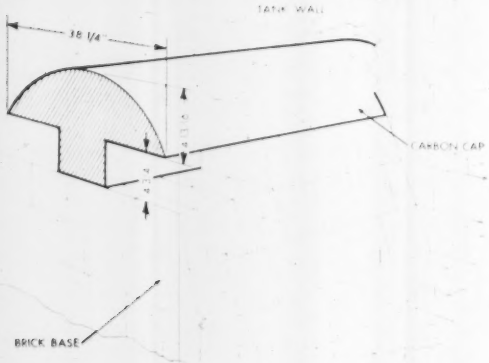
By J. F. REVILOCK
National Carbon Co.
Union Carbide and Carbon Corp.

FOR LONGER PICKLING EQUIPMENT LIFE

Chemical applications of carbon, graphite and impervious graphite prove them ideal for the tough spots in pickling. Here are some design tips and performance data

Fig. 1 (top) shows how jet is made an integral part of tank wall, removing it from working area. Recess blocks and scour plates should also be carbon. Carbon skids, Fig. 2 (below) are being tried, but it is too early to report conclusions





HIGH COST of construction materials and the expense of excessive down time in the metal finishing end of steel mill operations is focusing attention on the selection and design of construction materials.

Nature of steel finishing processes involves the handling of corrosive acids, heat, abrasion, physical shock and electrical currents, all of which present a challenge to the design engineer. He must specify construction materials that are inert to chemical corrosion, dimensionally stable, resistant to thermal shock, and have high thermal and electrical conductivity and good machinability. Carbon, graphite and impervious graphite have these properties.

Wet Chemical Pickling — Wet chemical pickling of either strip or sheet steel affords many opportunities to capitalize on the physical and chemical characteristics of carbon, graphite and Karbate impervious graphite in the design of equipment components.

Constant immersion in hot acid solutions leaves much to be desired from the customary steam jet-heater construction materials because they are not completely chemically inert, they have inadequate thermal shock resistance and frequently poor dimensional stability.

The use of impervious graphite, graphite or carbon circumvents these demonstrated weaknesses, and are structurally practical when designed for steel mill operation.

For pickling operations in which steam temperatures can be limited to 340° F, impervious graphite is structurally preferable. Higher temperatures require graphite but some leakage through the risers and cross-overs may be expected.

Built-In Jet — In the design shown in Fig. 1 the jet is made an integral part of the tank wall, thus removing it from the working area of the tank. To further enhance the value of the built-in jet design, recess blocks fabricated from carbon and carbon scour plates are recommended.

Purpose of installing carbon blocks at these locations is to prevent the scouring action of the

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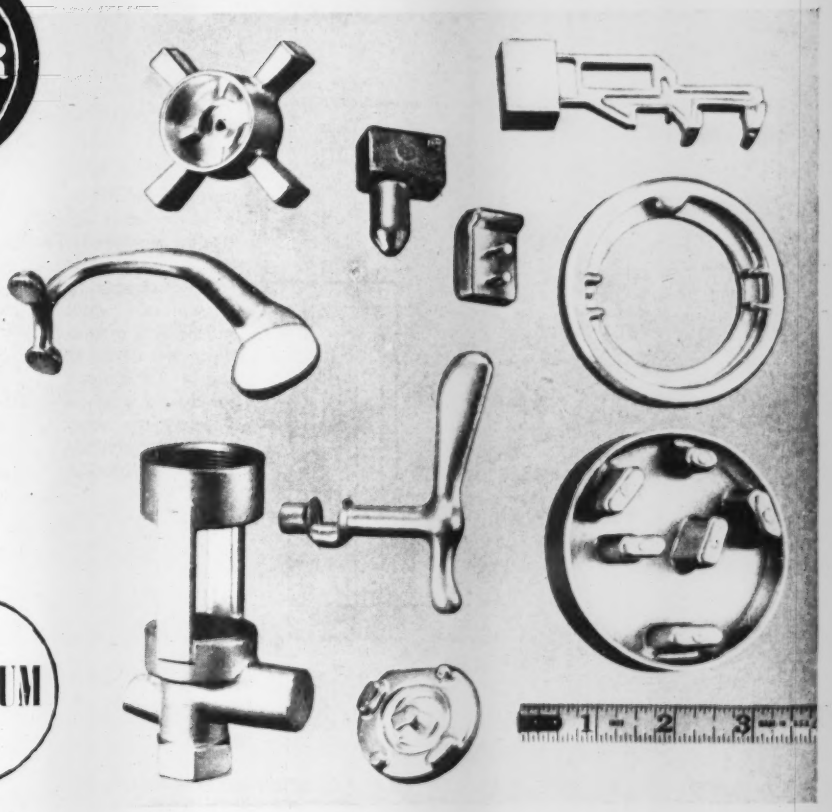

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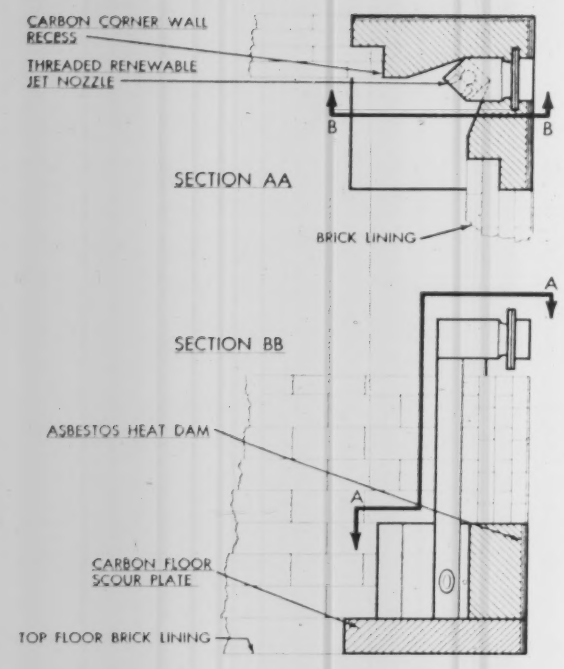

Fig. 3 shows how corner installation of steam jet is designed with recess blocks and scour plates. Scouring action of steam normally erodes cement from joints. One-piece machined carbon keeps joints away from jet openings and stops erosion

steam from eroding the cement joints which normally are very close to the jet openings. Since the carbon can be machined in one piece the joints can be moved a suitable distance away from the jet opening. Because of the material's machinability and ease of fabrication, the steam jets can be installed either in a corner or in the side walls.

Submerged Heaters—Submerged combustion type heaters for pickling solutions have been tried with varying degree of success, due to the limitations of most construction materials. This type heater, using gas as a fuel, is being fabricated from graphite and impervious graphite. Proper design, combined with good installation and operation to prevent excessive vibration, makes this type of heater very economical in those sections where a cheap source of gaseous fuel is available.

When dilution of the pickling or tinning electrolyte is a problem, use of impervious graphite immersion type or tube and shell heat exchangers is recommended. Immersion types may be standard plate type exchangers, simple hair pin coils or bayonets installed in the tanks. The plate type is especially rugged.

Complete success of any immersion type heater depends on careful design of the installation to provide either recesses or bumpers to protect the units from being hit by the steel. A few simple precautions will add to the success assured by the chemical immunity and high thermal conductivity of impervious graphite.

Tubes and Pumps—Impervious graphite shell and tube heat exchangers through which the acid solution is circulated in a continuous cycle by "Karbate" impervious graphite centrifugal pumps are installed completely outside of the tanks, usually in a suitable sump. Impervious graphite pipe and fittings are used between the heat exchangers and pumps to the tanks so that the solution need never encounter metal or other corrodable material at any point in the system.

An important advantage of the closed, external heating system is that the solution is not gradually weakened by the addition of water, as occurs when live steam is used. Also, by installing one extra exchanger, a rotating cycle can be set up to allow one exchanger at a time to be out of service for cleaning and flushing.

Acid Inlets—The wall section around the acid inlet has been a constant problem because the cement joints are eroded out by the strong acid flow necessary to keep the pickling solution at full strength. Large carbon blocks, built into the walls in the area of the acid inlets have solved this problem.

Resistance of carbon to abrasion and its chemical resistance to sulphuric acid make it a most desirable material for capping the skid blocks in catenary picklers as a solution to the maintenance problem in this part of the pickling line. Carbon skids of the design shown in Fig. 2 are being tried at two different plants, but the application has not been in service long enough to make any conclusive determinations.

Good Roll Service—Combination graphite and impervious graphite conductor rolls have been used in the pickling sections of hot dip tinning tanks for over two years with every indication that they will last many more years with practically no maintenance. On the other hand, stainless steel conductor rolls have an average life of only eight to twelve months.

As their use is established and the design and fabrication more or less standardized, the initial cost will be less than stainless steel, to add to the multiple economy of longer life, lower maintenance, higher electrical conductivity, less frequent down time for changing, and the less apparent gains attained by more satisfactory operation.

Spray Pickling—In recent years spray pickling has received consideration as a substitute for tank-type pickling operations. The corrosive conditions existing are the same as with immersion pickling and the equipment must be equally corrosion and abrasion resistant. Obviously the heating of the pickling solution must be done in an external heating cycle, where impervious graphite shell and tube

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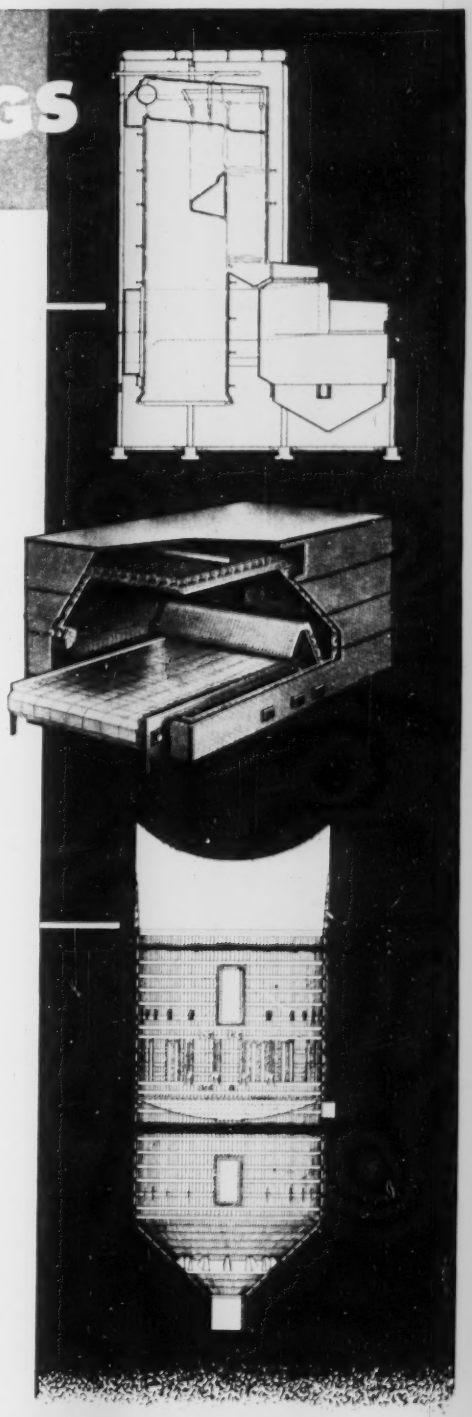

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heat exchangers, pumps, pipe and fittings, as described for immersion pickling tanks, are ideally suitable.

Nature of this operation presents additional opportunities to use carbon materials of construction. For example, the nozzles used to spray the acid solution onto the steel must be highly corrosion-resistant, which suggests the use of impervious graphite. Conveyor rolls remain as critical from the standpoint of first cost, maintenance and service life as is found in immersion pickling, and in both cases, may be fabricated from carbon.

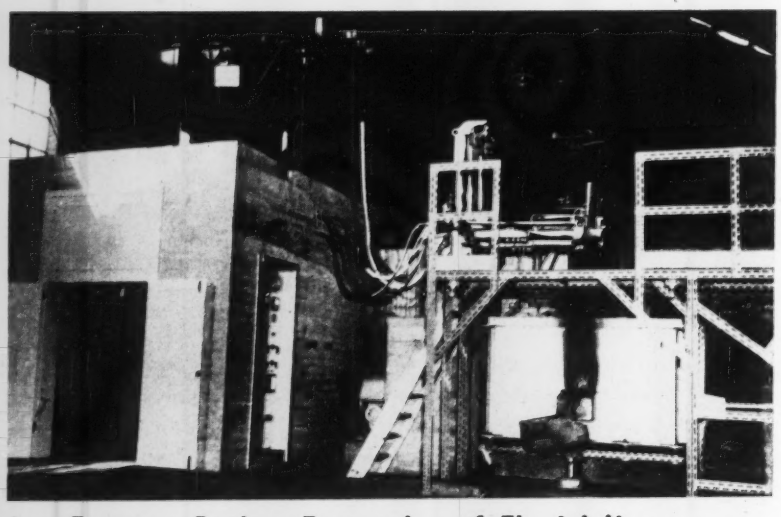
One of the deterring factors in the consideration of spray pickling units has been the availability of proper materials to resist the highly corrosive acid fog. The use of carbon, graphite and impervious graphite will help to accelerate adoption of spray pickling process.

Dry Chemical Pickling — Dry chemical pickling offers many process advantages that are not being overlooked. The elimination of liquid chemicals and tanks permits the construction of smaller, more compact units. Washing and drying passes are unnecessary. This speeds up the whole cycle to a considerable degree and, at the same time, removes the inherent difficulties and untidiness of handling corrosive liquids.

One of the problems in this new process is to maintain the anhydrous hydrogen-chloride atmosphere in the pickling chamber. A carbon curtain at both the entrance and exit ends of the pickling section seals the chamber and is acid resistant, abrasion resistant and can be readily fabricated.

Carbon brick walls inside the pickling chamber also resist the corrosive effects of this acid laden atmosphere. In the production of anhydrous hydrogen-chloride a lesson can be learned from the chemical industry in that graphite combustion chambers and burner nozzles are practically "required" because of their complete chemical resistance, immunity to thermal shock and retention of strength at high temperatures.

Even though the atmosphere in the pickling chamber is gaseous it must be constantly circulated by extraction and replacement.



Arc Furnace Probes Economies of Electricity

Lectromelt Furnaces of Canada completed installation of a 200-kva arc furnace in Ottawa laboratory of Canada's Division of Mineral Dressing and Process Metallurgy. Division reports its furnace will be employed particularly for experiments in which very high temperatures are required and to determine where heat may be obtained more economically from electricity than from fuel

Closed circuit melting: Complete protection from outside variables

STEEL MELTING process, with features designed for improving on nature, will be built by Universal-Cyclops Steel Corp. at its research laboratory in Bridgeville, Pa. Basic features of this process, described by the company as closed circuit melting, have been used experimentally in laboratories in this country and abroad for several years. Present installation is expected to be the largest commercial pilot plant scheduled for operation, and is designed to produce commercial size ingots.

Conventional steel-melting practices use slags and fluxes to react with and insulate molten metal from nature's atmosphere. These help tie up oxygen, nitrogen, sulphur and other impurities in less undesirable forms in the finished metal. But this degree of control has proved unsatisfactory for many high alloy steels.

Complete Cover—The closed circuit system can provide a complete cover for the melting process, protecting chemical reactions in the molten bath from all variables in outside air content, such as moisture, gases and pressure.

Process will incorporate many new technical features thus far unique in developmental work. Closed circuit melting opens the way to melt alloy steels containing large quantities of highly-reactive elements such as titanium, zirconium, aluminum and magnesium. These are now manufactured with great difficulty by commercial arc furnace practice.

Specific Pressure—Through continuing research, it will be possible to extend the steelmakers' horizon to include the manufacture of metals that cannot now be attempted because of the effect of nature's atmosphere and pressure in melting and refining of these rare metals. In describing the process, James D. Nisbet, director of research and development, said the new process will permit removal of air from the melting furnace by substituting a vacuum, an inert or a reducing gas. In such a closed system, a specific, controlled pressure can be substituted for atmospheric pressure which will be best suited to reactions and conditions desired for various metal compositions.

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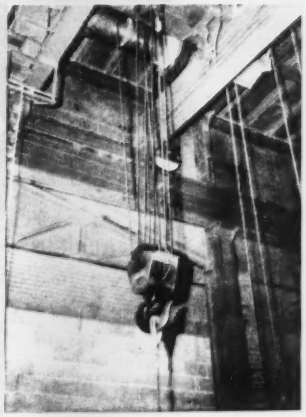

New Tuffy Hoist Line now joins Tuffy Slings to give you a hoisting team that provides more service and safety from drum to load. Tuffy Hoist Line is especially designed for overhead, stiff leg and mobile cranes, for derricks and clamshells.

Forget Complicated Specifications on various rope constructions offered for hoist line service! Just state length, diameter and the name Tuffy Hoist Line. You'll get a rope that will cut hoist line costs and down-time, absorb load shocks and stay on the job longer than any rope you've ever used! Put the Tuffy Team to work for you and see the difference!

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Tell him the diameter and the length—that's all you need to order your Tuffy Hoist Line. To order slings—it's simply Tuffy, type, length, diameter and fittings! Or, you can order Tuffy braided wire fabric on the reel, if you do your own rigging. Remember, your distributor is backed up by nearby mill depot stocks to insure prompt delivery.

containing 48 pages of useful information. Also Tuffy Hoist Line folder.

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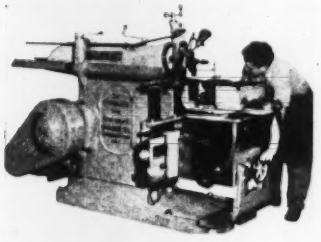
PRODUCTS and equipment

Reply card on page 93 will bring you more information on any new products and equipment in this issue

Fast-Positioning Shaper

. . . with tilt table positioner

Standard 24-inch shaper is equipped with special tilting table that minimizes setup time by positioning work quickly and accurately. Table tilts about a pivot



and is driven by hand crank arrangement, convenient to operator's position.

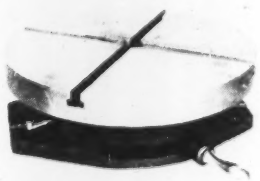
Quick-clamp design is also provided to maintain accurate setup. Cincinnati Shaper Co., Dept. ST, Hopple, Elam and Garrard Sts., Cincinnati 25, O.

FOR MORE DATA—CIRCLE REPLY CARD NO. 1

Cam-Locking Rotary Table

. . . locked in any position

This rotary table is built for fast manual rotation in assembly and subassembly operations. It can be locked in any position in assembly



work on small and medium-sized parts—such as scraping lathe cross slides, drilling and tapping holes around a part.

Table is hand scraped on two bearing surfaces to fit the cast iron base. Table locking is accomplished by quick-acting cams. Center bearing is adjustable to take up wear. Periphery can be graduated in degrees for angular movement. Troyke Mfg. Co., Dept. ST, 4422 Appleton St., Cincinnati 9, O.

FOR MORE DATA—CIRCLE REPLY CARD NO. 2

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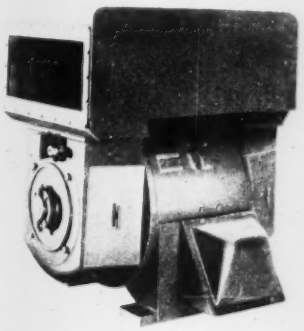
Totally-enclosed, unit-cooled direct current motor for use in severe atmospheres promises applications in machine tool, steelmaking and material handling operations. Available in ratings from



15 to 200 hp, it has a reported 50 per cent greater heat transfer in 37 per cent smaller space than previous designs.

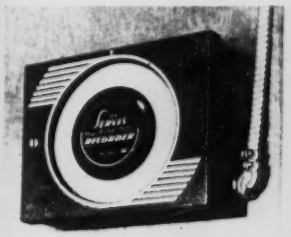
Compact cooling units, mounted completely within over-all length and width of the motors, permit operation at extremely low speeds for long periods of time. Reason: Ventilation is independent of motor speed. Thermostatic relay protects the main motor in case of blower-motor failure. General Electric Co., Dept. ST, Schenectady 5, N. Y.

FOR MORE DATA—CIRCLE REPLY CARD NO. 3

Productive-Time Recorder

. . . shows busy and idle time

Immediate visible record of productive and idle time of plant machinery is spelled out by this model M recorder. Its values include improving machine produc-



tivity, use in time studies to set rates and as a check on exactness of processing operations.

To operate, it requires only a wire connection to machine's motor and can be located anywhere — such as on an office wall. Recording can be observed as machine operates. To prevent unauthorized opening, the chart indicates whenever case was locked and unlocked. Service Recorder Co., Dept. ST, 1375 Euclid Ave., Cleveland 15, O.

FOR MORE DATA—CIRCLE REPLY CARD NO. 4

Semiautomatic Tube Bender

. . . bends finned or plain tube

Semiautomatic hydraulic-powered machine makes bends from $\frac{3}{4}$-inch to 2-foot radius in finned or plain ferrous and nonferrous metal tubing up to 40 feet long. Machine bends tubing up to $1\frac{1}{2}$ inch in diameter around a cone-shaped steel die that is adjustable both vertically and horizontally. This provides bending radii in infinitely variable increments within the

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large and small diameters of the cone.

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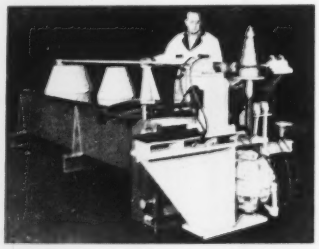


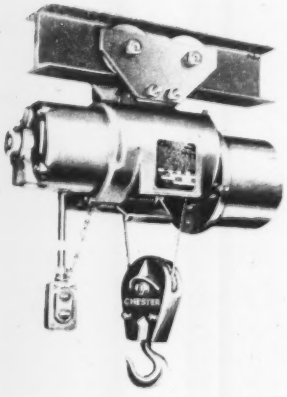
steel die. Bending table is powered by a high-torque, positive displacement, single vane hydraulic motor. Walter P. Hill Inc., Dept. ST, 22183 Telegraph Rd., Detroit 19, Mich.

FOR MORE DATA—CIRCLE REPLY CARD NO. 5

Electric Hoist Line

. . . braking on load and motor

This line of electric hoists is rated from $\frac{1}{4}$ to 2 tons. Basic features include high-torque electric motors with 30-minute 55° C time



rating; triple reduction gearing under continual lubrication; dual braking on load and motor for precise spotting control and maximum safety. Load braking system em-

(Continued on p. 96)

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INFORMATION

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58. Power Transmission Products

Lovejoy Flexible Coupling Co.—Tabulated data contained in 8-page brochure on power transmission products cover sizes, specifications and operating capacity. Flexible couplings, variable speed pulleys and transmissions as well as universal joints are covered.

59. Filtration Equipment

Honan-Crane Corp.—Two case histories which relate how Honan-Crane filtration equipment has solved coolant clarification problems at two large metalworking plants are presented in two available bulletins. One installation resulted in production capacity increase of 1872 hours per year, the other increased wheel life 73 per cent.

60. Threading Lathe

James Coulter Machine Co.—An automatic threading lathe that operates fast and accurately on various diameters and materials is described and illustrated in an 8-page illustrated folder. The type A model LI machine has its features listed, construction described, specifications given and examples of production shown.

61. Spring Steels

Sandvik Steel, Inc.—Tabulated information featured in 32-page catalog 50 on cold rolled and bright annealed spring steel and hardened, tempered and polished spring steel, covers thicknesses, weight in pounds per 100 ft, comparative wire gages used in U. S., conversion tables, hardness conversion tables and temperature conversions.

62. Gas Fired Unit Heaters

United States Air Conditioning Corp.—Series 23A gas-fired unit heaters described in 12-page bulletin 23-3 include propeller fan and blower types. Each is produced in 14 models, ranging in capacity from 55,000 to 500,000 Btu per hour and burning all types of gas at rated capacities. Capacity tables and roughing-in dimensions as well as structural and operational descriptions are included.

63. Industrial Spray Nozzles

Spraying Systems Co.—Thousands of standard and special industrial spray nozzles are illustrated and described in comprehensive 48-page catalog 24 along with data covering capacity and spray angle. Dimensional specifications are given as well. Such related equipment as line strainers, elbows, check valves and adjustable joints are also specified.

64. Welding Alloys & Fluxes

All-State Welding Alloys Co.—More up-to-date data are included in 24-page revised, pocket-size buyers guide on complete line of alloys and fluxes for welding, brazing, soldering, cutting and tinning most of the commercially used metals.

65. Employee Literature

Tyd-Howard Co.—Series of booklets tailor-made for employee information racks are designed to deliver a thoughtful message as well as provide good reading. Subjects covered include traffic safety, operation of the American business system, hobbies, outdoor camping and living, child safety, citizenship and the industrial worker.

66. Welders Garments

Eastern Equipment Co.—Such welders garments as capes, coats, jackets, pants, chaps, sleeves, bibs, gloves, mitts, spats and aprons, all made of chrome-tanned leather are described in 4-page folder AWI-40. A helmet with headgear and leather electrode carrier are also shown along with such asbestos garments as five-finger gloves, leather faced gloves, one-finger mitts and reinforced mitts.

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67. Atmosphere Furnace

Surface Combustion Corp.—Allcase batch type controlled atmosphere furnaces, made in standard and heavy duty sizes, is subject of 6-page bulletin SC-163. Radiant tube heated unit is equipped with recirculating fan and enclosed quench. Construction drawings and typical applications are shown.

68. Granite Surface Plates

Taft-Peirce Mfg. Co.—Granite surface plates, made with surface dimensions from 9 x 12 in. to 48 x 96 in., are described in illustrated bulletin 510 of 4 pages. Angle of grain to working surface is about 45 degrees to minimize chiping or breakage.

69. Hydraulic Presses

Lake Erie Engineering Corp.—In 16 illustrated pages, bulletin 10.1 covers hydraulic bending, straightening and plate forming presses. Gap type traveling head, column, side plate and special design units are individually described. Capsule specs are given for each of the many models illustrated.

70. Hardness Correction Chart

American Chain & Cable Co., Wilson Mechanical Instrument Div.—Made in handy pocket size from tough celluloid stock, cylindrical correction chart for rounds gives corrected values for hardness readings taken on spherical surfaces by conventional indentation methods. Various Rockwell scales are covered.

71. Seamless Tubing

Columbia Steel & Shafting Co.—"Summerill Tubing" is title of 8-page illustrated booklet giving sizes, working pressures, specs and other engineering data for a range of cold drawn seamless tubing including hydraulic, pressure, mechanical, diesel, aircraft and special types. Typical applications are shown.

72. Apron Conveyors

Link-Belt Co.—4-page illustrated catalog No. 2470 deals with pano-hinged apron conveyors in three pan types, four chain pitches and four basic assemblies. Pans are available in widths from 12 to 48 in. fabricated from any desired material.

73. Rust Preventive Papers

Orchard Paper Co.—Type VPI rust preventive packaging papers are discussed in collection of reprints, technical articles and other engineering data available in binder-type folder. Collection will give the answer to any question on uses and applications of this material, which includes many grades to MIL specs. Folder also contains actual samples of various grades.

74. Temperature Controls

Barber-Colman Co., Wheelco Instruments Div.—Information on selection of sensing elements and their correct use for the best results in industrial process temperature control is found in 8-page educational bulletin F 6149. Various types of systems are explained.

75. Electric Industrial Trucks

Automatic Transportation Co.—Revised condensed catalog on electric industrial trucks includes data on the Dynamotive gas fork lift truck with electric transmission and representative models of riding type and driver-led models. Attachments are shown.

76. Honing Machines

C. Allen Fulmer Co.—Four models of internal honing machines are covered in 16-page well-illustrated bulletin, which also contains explanations of the process, tooling hints and descriptions of various accessories available. Units range in capacity from ½ to 15 in.

77. Air & Hydraulic Cylinders

Lindberg Engineering Co., Air & Hydraulic Div.—Complete line of heavy duty air and hydraulic cylinders is detailed in bulletin 800 which gives their design and application features. Large custom-built heavy duty cylinders are also covered.

78. Stranded Electrodes

Air Reduction Sales Co.—"Stranded Electrode Materials for Aircomatic Welding" is title of 12-page illustrated booklet discussing use of stranded wire electrodes in the inert-gas shielded metal-arc consumable electrode process. Case histories of advantageous applications are shown, together with photomicrographs.

79. Testing Instruments

J. W. Dice Co.—Pictured and specified in 8-page bulletin 32 are unusual nondestructive testing instruments applicable to the metalworking, automotive, aircraft and other industries. Metal-testing instruments, tramp metal detectors, electronic micrometers, pipe finders, leak detectors,

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12-21-53

Please send literature or detailed information on subjects circled at left to—

power equipment testers, and pressure measuring equipment are covered.

80. Water Hose

Quaker Rubber Corp.—Many types of Quaker water hose available are described and shown in photo and cutaway section in 4-page bulletin. Tables of sizes, working pressures and weights are included, as are data on lengths, couplings and recommended applications.

81. Lifting Clamps

J. C. Renfroe & Sons, Inc.—Various steel lifting clamps with capacities ranging between 1 and 20 tons are covered in 16-page illustrated catalog No. 950. A toggle-action snap-lock is built into many of the units, serrated cam-type locks into others. Full details and specs are provided and parts numbers given.

82. Time Delay Relays

Elastic Stop Nut Corp. of America, A'G'A' Div.—Line of solenoid-actuated, pneumatically controlled time delay relays is described in 4 pages of illustrated catalog SR-3. Relays with time delay beginning when coil is energized or when it is de-energized are covered.

83. Stainless Steel Tubes

Globe Steel Tubes Co.—Welded and seamless stainless steel tubes are subject of 8-page illustrated bulletin S-222. Their workability, advantages, sizes, analyses and standard tolerances are presented, along with technical and fabricating data.

84. Industrial Porcelain

McDanel Refractory Porcelain Co.—36-page illustrated Catalog "McDanel Industrial Porcelains" presents information on wide variety of porcelain products, their applications and specifications. Included are such items as crucibles, grinding jars, heat reflectors, mill linings, pyrometer parts and insulating tubes. Much working data are included.

85. Threading Heads

Landis Machine Co.—"Hardened and Ground Threading Heads" is an illustrated bulletin of 12 pages bearing No. F-80-5 which deals with design features, specifications and technical data for these tools. Lanco, Landex and Landmatic types are detailed and standard and oversize chaser holders are covered.

86. Rust Preventive Products

Rust-Oleum Corp.—In addition to providing an outstanding tretise on rust prevention, 20-page form 253 en-

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probably the largest stock of stainless plate in one location—produced to meet rigid chemical industry standards in a wide range of sizes, gauges and analyses.

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titled "Stop Rust with Rust-Oleum" features 94 color chips of Rust-Oleum products and includes complete instruction for surface preparation and application. Products covered include primers; short oil, long oil, machinery and implement finishes; chemical and heat resistant finishes; sealers; oil field finishes; thinning oils; and floor and masonry coatings.

EDITORIAL ARTICLES

Available in Limited Quantities

87. Vacuum Impregnation

Under heavy stress of jet engine service, porosity in cast gearbox housing can spell serious trouble. York Gears Ltd. of Toronto which makes steady delivery of magnesium gearbox castings attributes its minimum of rejects to impregnation with Permafil 3255 in vacuum equipment built by F. J. Stokes. STEEL article "Vacuum Impregnation" describes this setup which is run by one operator.

88. Chromizing Metals

Surfaces of ferrous metals can be "rebuilt" by trading iron for chromium atoms. The chromized case is a true alloy layer that does not spall, peel or flake. Dimensional changes are slight. For the story, read STEEL article "Putting Chrome on Ferrous Surfaces," by R. L. Wachtell of Chromalloy Corp.

89. Cold Finished Bar Mill

Cold finished steel is finding an increasing list of applications among manufacturers who have their minds on their pocketbooks. Dr. Allen G. Gray, Technical Editor, presents the story of a new mill built to supply this class of steel for a specific market in STEEL article "Bar Mill Built to Serve Market."

90. Centralized Lubrication

STEEL article "Centralized Lubrication Elixir for Machine Life" by R. F. Huber, Machine Tool Editor, points out that the right lubricant is only part of the answer. The lubricant, like a good army, must also be in the right place at the right time and in the right amount. Article effectively points up what centralized lubrication has to offer.

TO GET LITERATURE . . .
reviewed in this column, circle corresponding item number on reply card found in literature insert.

NEW PRODUCTS and equipment

(Continued from p. 92)

ploys nonreversing automatic spring clutch to actuate oversize Weston brake without pawls or ratchets.

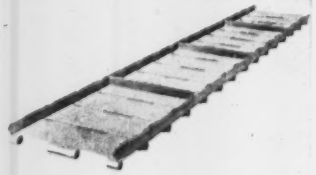
Either motor or load brake can hold rated load indefinitely suspended, even when power failures occur. Of the eight hoists, five have flexible wire rope cable lift and pendent pushbutton control; three have welded alloy steel link chain lift and pendent rope control. Chester Hoist Division, National Screw & Mfg. Co., Dept. ST, Lisbon, O.

FOR MORE DATA—CIRCLE REPLY CARD NO. 6

Piano-Hinged Apron Conveyors

. . . assure minimum opening

Augmented line of piano-hinged apron conveyors — in three pan types, four chain pitches and four assemblies — meets a wide variety of conveyor applications. Pans are interlocked at articulation point to



provide minimum opening and smooth joint, and to prevent material from seeping through. Tight hinges reduce tendency to wedge or pinch materials being conveyed.

Among materials for which the conveyors are designed are castings, stampings, scrap and chips. For foundry application, larger sizes provide a movable table for sorting castings. Perforated cans can be furnished for quench tank service. Link Belt Co., Dept. ST, 307 N. Michigan Ave., Chicago 1, Ill.

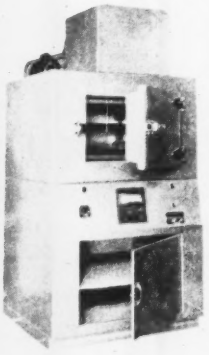
FOR MORE DATA—CIRCLE REPLY CARD NO. 7

Box-Type Recirculating Furnace

. . . temperatures to 1250 F

This electric box-type recirculating furnace is built for temperatures up to 1250 F. Furnace is built in nine different sizes and two different heat ranges 0 to 800 F and 0 to 1250 F. Sizes are from 18 x 12 x 18 inches to 24 x 24 x 36 inches.

Unit is designed with skirt type cabinet, furnished with the electronic indicating temperature con-



troller, contractor and switch box. K. H. Huppert Co., Dept. ST, 6830-32 Cottage Grove Ave., Chicago 37, Ill.

FOR MORE DATA—CIRCLE REPLY CARD NO. 8

Nail Gripper Die Nibs

. . . standard carbide line

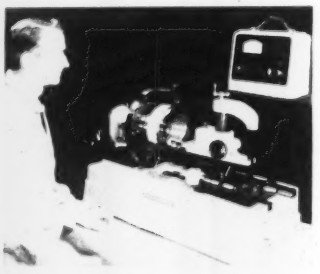
Standard line of unground cemented carbide nail gripper die nibs is offered by the manufacturer in four sizes. These range from ½ to ¾-inch, designated NDB 8, 10, 11 and 12, stocked in grade 190 cemented carbide. Carboloy Department, General Electric Co., Dept. ST, Detroit 32, Mich.

FOR MORE DATA—CIRCLE REPLY CARD NO. 9

Precision Measuring Instrument

. . . amplification: 2000 to 1

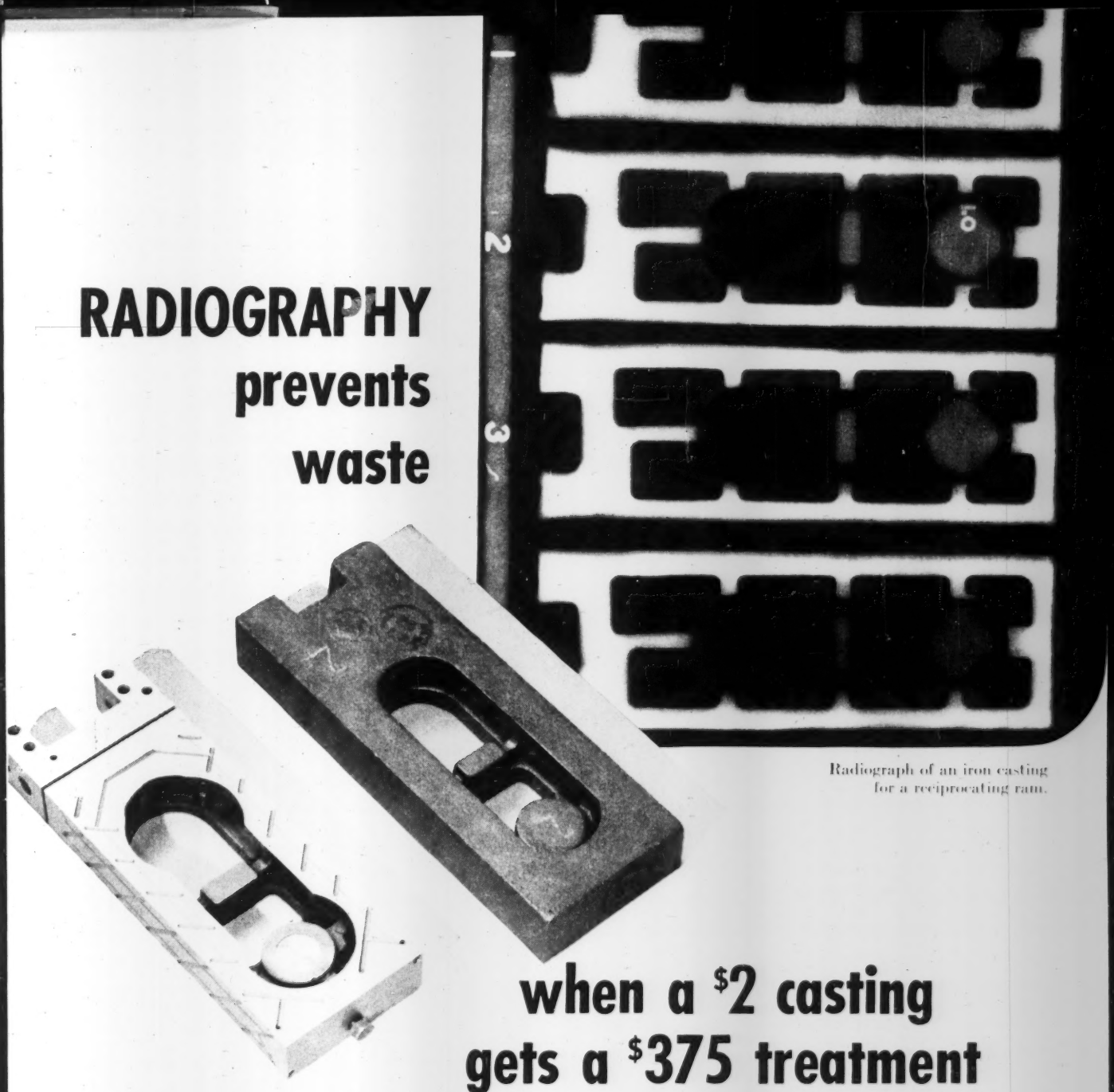
Bench type precision measuring instrument gages lead, taper, straightness and concentricity of straight and tapered plain and



thread ring gages. Its capacity for checking ring gages reaches 8 inches maximum ID, 10 inches maximum OD.

Electronic amplifier with ampli-

RADIOGRAPHY prevents waste



Radiograph of an iron casting for a reciprocating ram.

when a $2 casting gets a $375 treatment

This is a casting for a reciprocating ram. It is to be machined and hand scraped to a final flatness of less than .0001 inch. Should porosity show up during machining, the cost of work done and heat treatment is wasted. The part must be scrapped, not scraped.

But radiography avoids that. By x-raying every casting, flaws are discovered before work is started . . . before hundreds of dollars have been invested in machining and heat-treating costs.

This is another example of the savings possible through radiography.

If you'd like to be sure all your castings are sound—if you'd like to know ways to improve yield in production runs—get in touch with your x-ray dealer. He'll gladly talk it over. Or, if you like, write us for a free copy of "Radiography as a Foundry Tool."

EASTMAN KODAK COMPANY
X-ray Division, Rochester 4, N. Y.

Radiography . . .

another important function of photography

Kodak
TRADE-MARK

fication of 2000 to 1 can be located remotely for operator convenience. It has a zero center equilinear scale directly graduated in 0.00005-inch, with 0.0015-inch range. Interchangeable ball point gaging tips are supplied with the instruments to permit gaging almost any thread. Sheffield Corp., Dept. ST, Dayton 1, O.

FOR MORE DATA—CIRCLE REPLY CARD NO. 10

Soldering Paste Compound

. . . applied cold, then heated

Step-saving soldering paste, compounded of flux and solder, is applied cold then heated to 375 F to seal, join or tin most common metals except aluminum. Varied applications in both manufacturing

and maintenance should result from its ease of application accomplished without soldering iron.

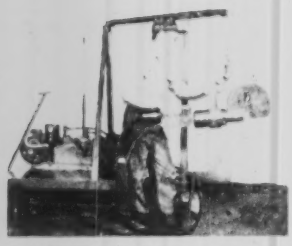
In tubing work, pressure tests up to 6500 psi failed to break soldered joints. All-State Welding Alloys Co. Inc., Dept. ST, 249-55 Ferris Ave., New York, N. Y.

FOR MORE DATA—CIRCLE REPLY CARD NO. 11

Hydraulic Shear

. . . dolly-mounted for mobility

Steel rod 1¼-inch diameter can be cut in 3½ seconds with model 21 hydraulic Guillotine. Unit also



can cut aluminum rod to 1¾-inch diameter. It is designed for use in cutting and trimming coiled roll stock; for cutting on draw bench; for test cuts on piping and cutting cobbles in aluminum mills.

Cutter can be obtained dolly-mounted for mobility, with head suspended by spring tension balancer. Fifty tons cutting thrust is supplied through hydraulic pump powered by 2-hp motor. Manual control actuates without solenoid switches. Manco Mfg. Co., Dept. ST, Bradley, Ill.

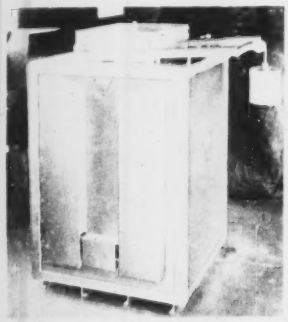
FOR MORE DATA—CIRCLE REPLY CARD NO. 12

Top Loading Furnace

. . . close control to 2500 F

Pit furnace, model PT-2550, provides control to 2500 F. This top-loader offers firing chamber of 18,900 cu in., measuring 18 x 25 x 42 inches. Lid over firing chamber is ball-bearing mounted, side-sliding and counterbalanced for easy action, to permit loading from hoist or conveyor.

With 9 inches of lightweight high-thermal insulation, furnace



can be equipped with any standard make temperature control. It has facilities for panel mounting. Perenv Equipment Co., Dept. ST, 893 Chambers Rd., Columbus, O.

FOR MORE DATA—CIRCLE REPLY CARD NO. 13

Wet Burnishing Process

. . . uses revolving rubber mats

Method of wet burnishing is designed to improve conventional polishing and buffing procedures. Machine employs revolving rubber mats that operate in a wet abrasive slurry. Parts to be burnished are advanced through the slurry on a carrier moving in a circular or other enclosure.

Ger-O-Matic machine is reported to account for a complete absence of dust, reducing fire and health hazards and making elaborate exhaust systems unnecessary. Compounds in the abrasive slurry are reused with little loss. Gerity-Michigan Corp., Dept. ST, Adrian, Mich.

FOR MORE DATA—CIRCLE REPLY CARD NO. 14

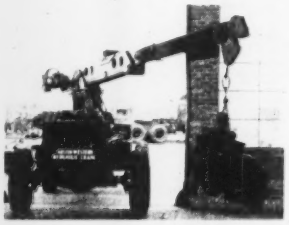
Indoor-Outdoor Crane

. . . lightweight, fast-moving

This indoor-outdoor hydraulic crane combines features of crawler, truck and erection types, with those of industrial shop cranes. It is self-propelled, hydraulically operated.

These four functions are involved: Turntable rotation, boom elevation, raising and lowering cable and hook, power extension and retraction of boom.

Lightweight, fast-moving model, adapted from a machine designed



originally for the Navy, should be valuable in general handling use, in warehouses and in repair shops. Specifications: 360-degree boom rotation; 24-foot horizontal reach from center; 24-foot vertical lift from ground level; ability to negotiate 20 per cent grades under full load; 15-mph road speed. Austin-Western Co., Dept. ST, 601 N. Farnsworth Ave., Aurora, Ill.

FOR MORE DATA—CIRCLE REPLY CARD NO. 15

Water Soluble Coolant

. . . absolutely free from oil

General-purpose coolant is a chemical, aqueous true solution that is cold blue and transparent. It is completely water soluble and absolutely free from oil, but meets most requirements for cutting, sawing and grinding.

The coolant is odorless, does not smoke or become rancid during use. Its high stability permits retention of efficiency during cutting. Dynamic Industrial Products Inc., Dept. ST, Danbury, Conn.

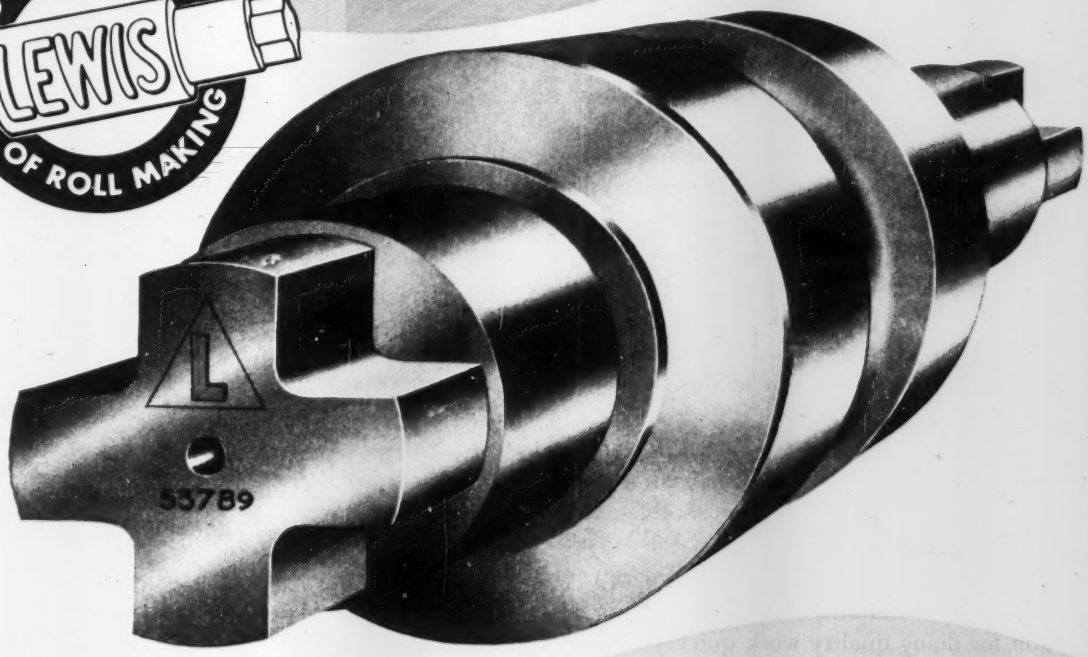
FOR MORE DATA—CIRCLE REPLY CARD NO. 16

THE EXPERIENCE and MANUFACTURE OF

LEWIS ROLLS

. . . Known and used wherever metal is rolled

OVER 90 YEARS LEWIS OF ROLL MAKING



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NON-FERROUS INDUSTRIES

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- AJAX DUPLEX ROLLS
- LEWIS "X" AND "XA" ROLLS
- SPECIAL PROCESS ROLLS
- CLIMAX AND AJAX ROLLS
- PLAIN CHILLED IRON ROLLS
- SPECIAL TUBE MILL ROLL
- ATLAS, ATLAS "B" AND ATLAS "X" ROLLS
- MOLYBDENUM CHILLED IRON ROLLS

may we have the opportunity of studying your requirements
and submitting our recommendations

ROLLS DIVISION OF BLAW-KNOX COMPANY, PITTSBURGH, PA.

At this point delay is costly!

Pittsburgh Steel Company's new hot mill at Allenport, Pa., during installation

THE FINEST steel mill equipment becomes a real asset only after it is properly installed and in operation. The machinery pictured above is typical. Until actual production of finished sheets began, the 28 millions of dollars required to complete this facility earned not one penny.

On this project, as on thousands of others, Commercial Contracting Corporation completed its job—the installation of finishing stands, runout tables, and other equipment—in record time.

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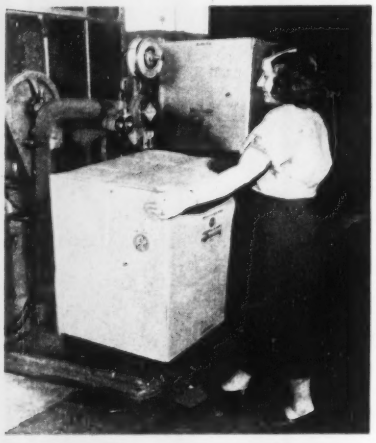
Stitchers Cut Hand Work

Hand work force cut in half. So is carton assembly time. Cartons give better protection, too

FOUR CARTON stitching machines reduce the work force in the packaging department 50 per cent, cut carton assembly time in half and increase production 20 per cent at Burroughs Corp., Detroit. All these benefits are the result of their finding a solution to a "growing pains" problem that involved lack of space for workmen and a constant demand for increased production.

Dimensions of each adding machine vary, making it necessary to keep considerable packaging stock



CARTON STITCHING
. . . assembly time is halved

on hand. More than 200 different sizes and shapes of fillers are required for the 16 carton sizes Burroughs uses to ship its business machines. Because of the limited floor space, knocked down cartons and fillers are used—they can be stored easily and assembled as needed.

Too Many Hands—Formerly, 17 girls were required to prepare the cartons and fillers for the packaging operations. Assembling the cartons and fillers was an expen-ive and time consuming job that required many hand assembly operations. Now, with fewer than half the number of workers and four stitching machines, two of them Silverstitchers manufactured by Acme Steel Co., Chicago, production has increased considerably and

congestion in working areas is eliminated.

Both cartons and fillers are assembled by wire stitching. Fastening cartons by this method saves as much as 75 per cent in assembly time. Hand operations, such as glueing and placement of gummed tape, are cut to a bare minimum in the assembly of fillers.

Effectiveness of the carefully designed cartons and fillers was recently verified when three packaged units accidentally dropped off the rear of a truck. Although the carton was damaged, carton and filler stitches held fast, absorbing all of the shock and cushioning the machine in each carton.

Stainless for Cold Heading

MUCH BROADER application is foreseen for a special stainless steel that makes possible economical mass production of severely cold headed and upset fasteners and other parts. Known as Stainless No. 10, it is a modified austenitic chrome-nickel stainless that work-hardens slower than any of the conventional 18-8 analyses.

No. 10 is also useful for parts that must remain non-magnetic after severe cold working. After a 50 per cent reduction, with a field of 200 Oersteds, the permeability is approximately 1.002. After an 80 per cent reduction, the permeability is about 1.018.

Applications—Uses for this steel, developed and produced by Carpenter Steel Co., Reading, Pa., include fastenings, cold headed bolts, screws, upset nuts, instrument parts, etc. It is also good for blanking, forming and jobs involving severe coining, extruding and swaging.

Most important use for Stainless No. 10, however, is in cold headed screws and bolts — particularly those made with a recessed head — and for upset and punched nuts. Parts like these cannot be made economically with conventional 18-8 alloys because they work-harden too rapidly. No. 10's slow rate of work hardening also makes it ideally suited for thread rolling. Class 3 threads are readily obtained on parts made from this grade of steel.

It isn't KENDEX* unless it's KENNAMETAL*

KENDEX* is the Registered Trade-Mark of Kendex Tools which are made exclusively by Kennametal Inc.

Kendex tools feature a precision-ground, multiple-edge, screw-mounted, indexable Kennametal insert that needs no regrinding. When the insert's multiple cutting edges become dull, to throw it away is economical practice. Replacement cost is slight compared to that of regrinds.

Kendex tooling minimizes downtime for tool changing, eliminates tool grinding expense, and ends the false economy of reconditioning tools that have outlived their usefulness. Ask your nearest Kennametal representative for details. Kennametal Inc., Latrobe, Pa.

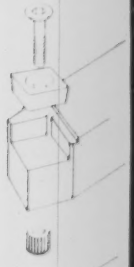
*Registered Trade-Mark.

How KENDEX* Works

1

Hard, strong, wear-resistant Kennametal is molded into square, round, or triangular Kendex inserts, which are precision ground.

2



Kendex inserts are mounted to suitable tool holders with socket head screws.

3

When edge becomes dull, insert is turned to new cutting position. When all cutting edges have been used, insert is thrown away, no regrinding.

KENNAMETAL*

CEMENTED CARBIDE TOOLING THAT INCREASES PRODUCTIVITY

SALES OFFICES IN PRINCIPAL CITIES

A-2

Bronze plated housings and caps (right) for Denison vane-type pump-motor (left). Steel rotor thrusts against plated surface of these parts

By W. H. SAFRANEK
Battelle Memorial Institute
Columbus, O.

W. J. NEILL
Columbus Metal Products
Columbus, O.

D. E. SEELBACH
Denison Engineering Co.
Columbus, O.

Bronze Plating . . .

SOLVES DESIGN AND CORROSION PROBLEMS

Bronze plate on bearing surface shows up better than solid bronze. Other uses: Decorative finish, salvaging mismachined parts, electroforming, stop-off in surface hardening

DESIGN ENGINEERS are always interested in ways to improve their products by substituting less critical and lower cost materials. Payoff is often better performance or simplified design.

A new process (developed by Battelle Memorial Institute, Columbus, O.,) for depositing bronze alloy plate has solved a knotty design and material problem in production of two new hydraulic pumps. Bronze plate on bearing surface gives better performance than solid bronze.

There are other uses for the copper-tin alloy process: Salvage of mismachined parts; stopping off surface hardening during nitriding; electroforming; decorative finishing of many types of parts.

With no restrictions on tin and recent price reductions in both copper and tin, manufacturers will be taking a good look at bronze plating in both decorative and engineering fields.

Housings Plated—In the example above, dual-purpose, 2000-psi single-stage, vane-type, hydraulic pump motors (delivering up to 80 gallons per minute as a pump and torques up to 2570 inch-pounds as fluid motors) are constructed with bronze plated cast iron housings. Bronze electroplate was chosen in preference to a 1/16 to $\frac{1}{4}$-inch bronze wear plate attached by adhesives, brazing, welding or mechanically. Selection was made nearly two years ago, when copper was in short supply. Saving: Up to 3 pounds of copper per pump.

Cylinder walls and bearing-porting surfaces of a rotor in piston-type pumps are also plated with bronze. By replacing solid bronze, electroplated steel saves still more copper and weight. Plated surfaces exhibit good antigalling properties, conformability and embedability. Loading capacity and fatigue strength are high. Bronze plate carries unit loads up to 7000 psi.

Life of piston-type pump designed for delivering 500 psi pressure is greatly increased through the use of

bronze electroplate. Solid bronze parts failed after a few hours of operation because of fatigue cracking. Steel quickly failed as a result of seizure due to welding. Bronze-plated steel was in high-speed service for 2800 hours. Part of the time, operation was at a pressure exceeding the design limit by 30 per cent. Yet, no significant wear was observed when the pump was taken down for inspection.

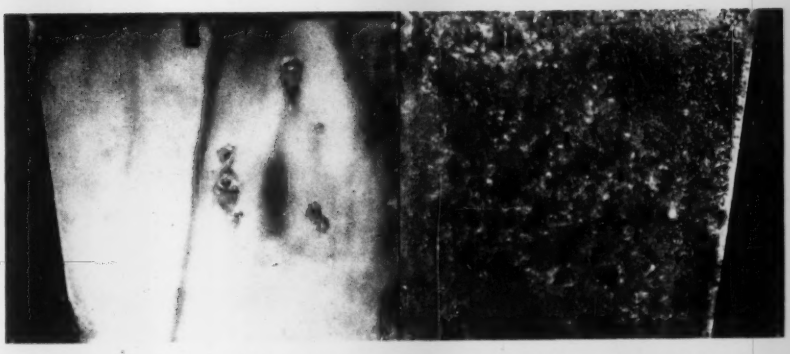
Background—Process was developed at Battelle under sponsorship of City Auto Stamping Co. Pumps are designed and manufactured by the Denison Engineering Co. (production began in June, 1952). Bronze plating is supplied by Columbus Metal Products, first company to install a commercial bath patterned after the new Lustralite plating process.

Lustralite plated alloy contains about 83 per cent copper and 7 per cent tin. Plating process is being developed commercially by the Battelle Development Corp., Columbus, O., with several metal-finishing supply houses serving the United States, Canada, and Europe with supplies for Battelle plating and electropolishing processes.

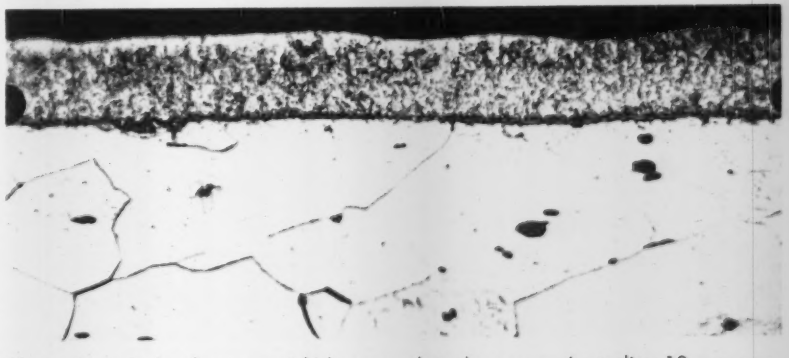
Bearings Good—One of the first vane-type pumps plated at Columbus Metal Products has been operated for 7200 hours at 2000 psi pressure with no interruptions due to bearing failure. Bronze plate on other pumps operated for shorter periods has exhibited no significant wear.

The vane-type pump-motor consists of a housing and cap, which are both plated with bronze and a pumping cartridge comprising a rotor, vane and cam ring. Cap and housing are iron castings providing port connections and supports for the shaft bearings. Design has been detailed in a previous publication[1].

Housings and caps are iron castings with a minimum tensile strength of 40,000 psi. Face sides are surface ground. Ports and bolt holes are plugged with rubber stoppers. Surfaces not to be plated are stopped off with paint. Castings are electrolytically cleaned, dipped in a dilute solution of muriatic acid, and plated with 0.007 inch of bronze alloy containing 7 per cent tin and 93 per cent copper. This thickness is deposited in about 5 hours. After plating, face surfaces are ground and lapped flat, leaving a minimum of 0.005 inch of bronze alloy plate.



These plated steel panels were exposed in a corrosive seashore atmosphere for 5 months. Copper-nickel-chromium plate (right) rusted and discolored severely. Bronze-chromium plate showed only a few rust spots



Photomicrograph of copper-rich bronze plate known as Lustralite 10, on carbon steel. Fine grained structure is resolved by etching with solution of ferric chloride and hydrochloric acid in alcohol

Photomicrograph of tin-rich bronze plate, known as Lustralite 20, using same etchant as above. Horizontal dimensions of crystals appear to be greater than vertical dimensions—unique for electrodeposited metal

Step Eliminated—When production was first started, surface layer of castings was decarburized in a high-temperature electrolytic salt bath to insure good adherence of bronze-alloy deposit. This step was omitted after tests showed that good adherence could be obtained without it. Heating in a salt bath at 700 F, plus final surface finishing, showed no evidence of inferior adherence.

Steel parts of piston-type pump are machined to size. Approximately 0.001 inch is electromachined by electropolishing from

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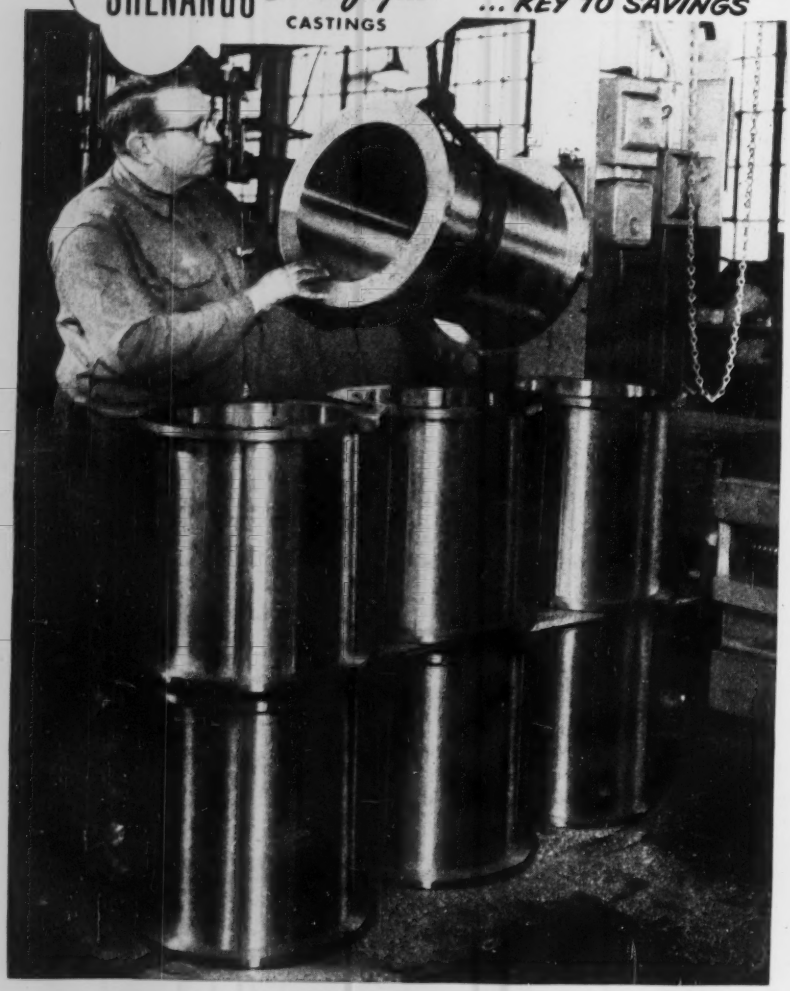

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BRONZE PLATING . . .

the surface to be plated and is replaced with an equal thickness of bronze alloy. Smooth bronze plate is not ground or lapped. It is satisfactory for assembly with no further finishing.

Salvage—Properties of bronze plate make it ideal for correcting mismachined parts. For example, control valves are salvaged by bronze plating at Columbus Metal Products at a small fraction of the cost of replacing them. These cast iron valves are 0.001 to 0.002-inch oversize on the bore diameter. Many are eccentric. Approximately 0.002 inch of bronze alloy is deposited on the bore surface, using rubber hose and rubber stoppers to mask off areas that were not to be plated. Anodes used are rods of bronze alloy. Each rod is positioned in the center of the bore to make the deposit uniform in thickness. Valves, resized by bronze plating, are giving good service. Results show that bronze alloy plate is an excellent material for facing valve seats.

The bore surface of guide-pin bushings, used with dies and molds, are plated with bronze. Thickness of the plate in this case is 0.002 inch.

Stop off—Bronze alloy plate is an efficient stop off against the penetration of nitrogen gas in the nitriding process for surface hardening. As little as 0.0005 inch prevents hardening at surfaces that must remain in a soft condition. This established application for bronze plating was adopted some years ago[2][3]. However, new Lustralite process is faster and easier than the old stannate bath, according to an operator who installed a Lustralite bath about 8 months ago.

Cold Casting — Fabrication by electrodeposition on shaped mandrels is known as electroforming[4]. Prior to restrictions, nickel was used for electroforming certain articles requiring a combination of good ductility, hardness, and strength not matched by copper.

Bronze alloy deposited by the Lustralite process provides this combination of properties. It is better than nickel for electroforming complex shapes because superior throwing power of bronze plating bath deposits metal more uniformly. Dies for molding plastics are

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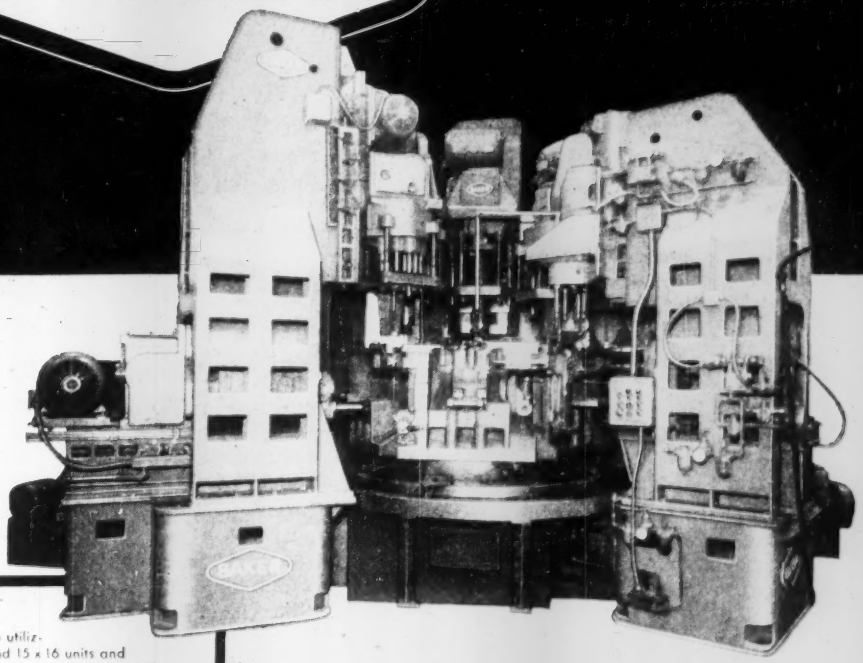
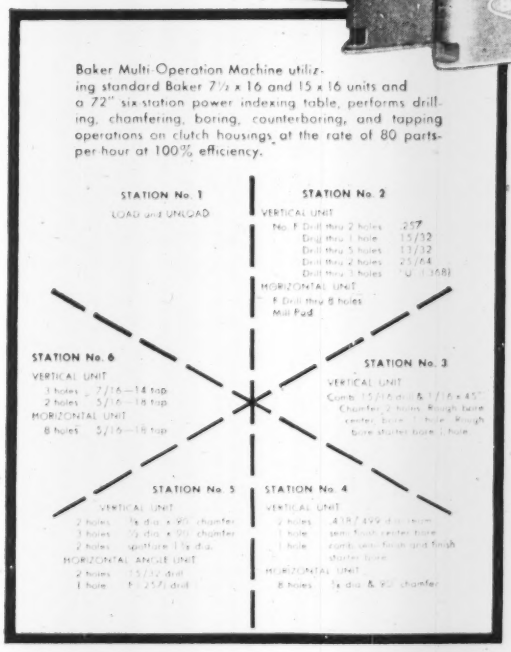


Baker Multi-Operation Machine utilizing standard Baker 7½ x 16 and 15 x 16 units and a 72" six station power indexing table, performs drilling, chamfering, boring, counterboring, and tapping operations on clutch housings at the rate of 80 parts per hour at 100% efficiency.


STATION No. 1
LOAD and UNLOAD
STATION No. 2
VERTICAL UNIT
No. 5 Drill thru 2 holes .257
Drill thru 1 hole 15/32
Drill thru 5 holes 13/32
Drill thru 2 holes 25/64
Drill thru 1 hole Q (.368)
HORIZONTAL UNIT
8 Drill thru 8 holes
Mill Pad
STATION No. 6
VERTICAL UNIT
3 holes 7/16—14 tap
2 holes 5/16—18 tap
HORIZONTAL UNIT
8 holes 5/16—18 tap
STATION No. 3
VERTICAL UNIT
Combi 15/16 drill & 1 1/16 x 45°
Chamfer 2 holes Rough bore
center bore 1 hole Rough
bore starter bore 1 hole
STATION No. 5
VERTICAL UNIT
2 holes 1¼ dia. x 90° chamfer
3 holes 2⅞ dia. x 90° chamfer
2 holes spotface 1¾ dia.
HORIZONTAL ANGLE UNIT
2 holes 15/32 drill
1 hole F (.257) drill
STATION No. 4
VERTICAL UNIT
2 holes 4 3/8 / 4 29/32 dia. rough
1 hole semi finish center bore
1 hole semi finish and finish
starter bore
HORIZONTAL UNIT
8 holes 1¼ dia. & 90° chamfer

Baker Special Drilling Machines, composed of standard Baker units arranged to suit each individual problem, are designed for *productivity*. Units arranged in vertical, horizontal and angular planes perform multiple operations *faster . . .better . . . automatically . . .* with greater accuracy and efficiency. Consult Baker engineers for a better solution to your drilling problems.

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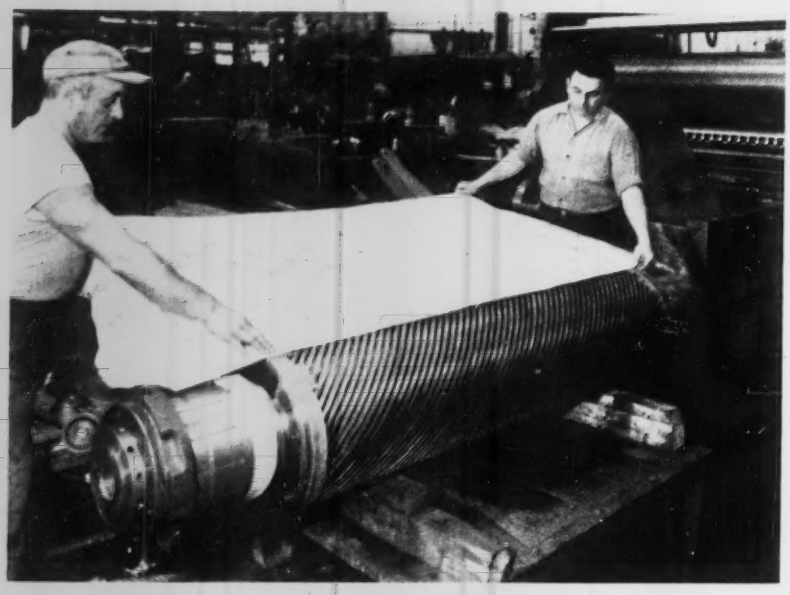

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One of three 4300-pound rollers of a 150,000-pound offset printing press manufactured by Miehle Printing Press & Mfg. Co. is rustproofed for shipment in heavy-duty vapor wrapper. The wrapper, paper treated with volatile corrosion inhibitor, is a product of Nox-Rust Chemical Corp., Chicago. Complete unit is also wrapped in a similar manner. Miehle reports the method saves about 96 manhours on this size shipment, plus eliminating messy depreservation

BRONZE PLATING . . .

electroformed in bronze using the new process.

Decorative — Restrictions on nickel plating can no longer be held responsible for the inferior corrosion provided by decorative electroplates. Bronze is furnishing good protection for several decorative applications. In this respect, it appears better than copper based on these test results: It delays rusting for a longer time and does not discolor as copper does in industrial or seashore atmospheres.

Copper plus chromium plates are often lacquered to prevent the discoloration of the copper through pores and cracks in the chromium deposit and to assist in protecting the steel parts from corrosion. The 0.00005-inch-thick flash of nickel allowed under previous NPA ruling between copper and chromium does not prevent copper from discoloring. However, bronze plus chromium, with no nickel in between and no lacquer over the chromium, provides good protection with no discoloration products.

Tests Speak—Steel panels plated with only 0.0005 inch of bronze plus 0.00001 inch of chromium and exposed outdoors for five months at Daytona Beach, Fla., were less rusted than panels plated with 0.001 inch of copper, plus 0.00005 inch of nickel, plus 0.00001 inch of chromium and exposed outdoors for only three months. Slightly thicker bronze plate (0.00075 inch) plus 0.00001 inch of chromium prevented rusting except for a few small spots. By comparison, copper-nickel-chromium plated panels were badly rusted, with more than 35 spots per panel, after only three months of exposure at Daytona Beach. Furthermore, the copper-nickel-chromium plate was badly discolored.

Properties—Bronze-alloy deposit produced by the Lustralite process is nearly three times as hard as copper plate, yet it is deposited in a ductile condition. Heat treatment for one hour at 700 F softens the bronze from about 270 to 240 Knoop. This heating apparently relieves a slight stress; no recrystallization was observed due to the heat treatment.

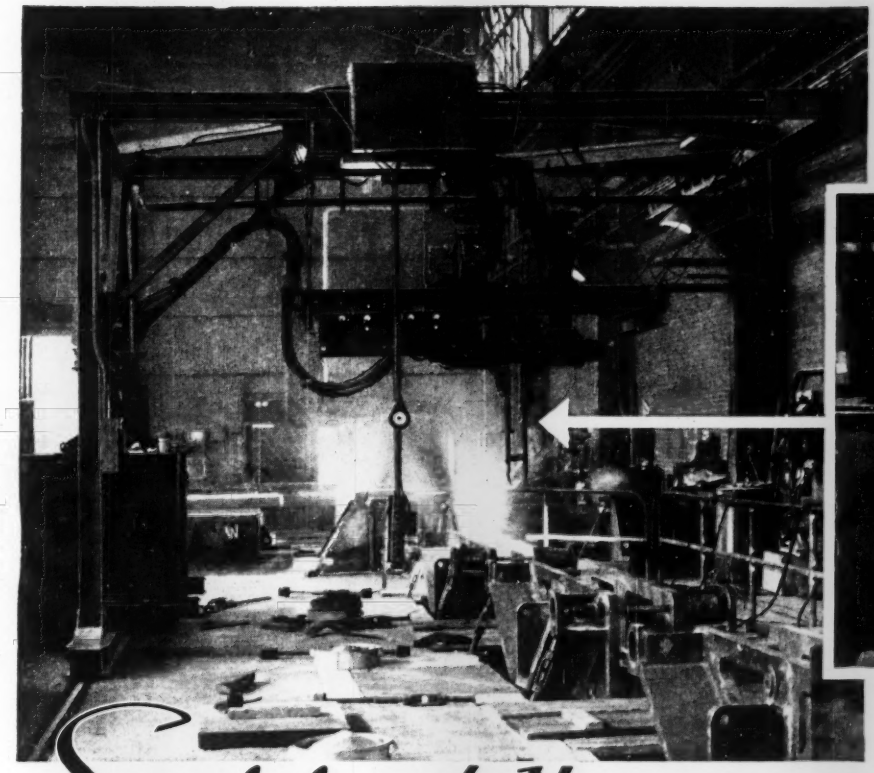
Structure of the alloy deposit is uniformly fine grained and appears to comprise a single phase. This structure is representative of Lustralite alloy plate containing 6 to 13 per cent tin and 87 to 94 per cent copper. Thickness of the plate is remarkably uniform, generally being 0.007-inch minimum and 0.008-inch maximum on the face surface of the castings. As a result, bearing surfaces are easily lapped.

Ordinarily, the 0.007 to 0.008-inch-thick plate is produced in a smooth condition. Bath is filtered about twice each month to maintain the good smoothness. Every 4 to 5 months, solution is treated with activated carbon to remove organic impurities that tend to reduce ductility of deposit.

Bath—Lustralite bath for depositing bronze alloy is comprised of a soluble stannous pyrophosphate complex compound, a copper cyanide complex compound and an addition agent for grain refinement. Supplementary salts are added to improve conductivity of solution, to promote dissolution of the alloy anodes, and to chelate certain metallic impurities that would cause inferior deposits if accidentally introduced in the bath. Patents covering this process have been issued or are pending.

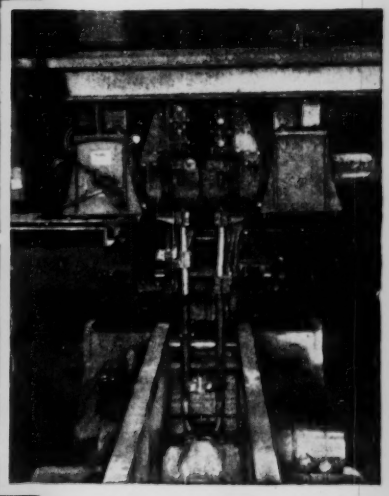
Composition of the plate depends on the ratio of the copper and tin dissolved in the bath, which is maintained by metal dissolved from the alloy anodes. Copper and tin are dissolved from the anodes at about the same rate as they are co-deposited on the cathodes. The bath operated at Columbus Metal Products for plating Denison's pumps has consumed about 500 pounds of bronze alloy dissolved from the anodes and plated on the pumps. No copper or tin salts have been added to the bath.

Maintenance — Small amounts of potassium cyanide are consumed by drag-out and oxidation. Between 3 and 6 pounds of potassium cyanide have been added each week to the 200-gallon bath to maintain the proper concentration of the free cyanide determined by direct titration with standard silver nitrate solution. Consumption of the cyanide has been less in the bronze bath than it is in copper cyanide plating baths. Supplementary additions of the grain refining agent have averaged less than one pound



Left — This welding gantry in a prominent steel mill is the first application of the new Cleveland Tramrail stabilized hoist principle for welding purposes.

Below — The welding heads supported by the stabilized hoist, travel without sway or vibration and automatically apply a straight continuous and accurate welding bead.



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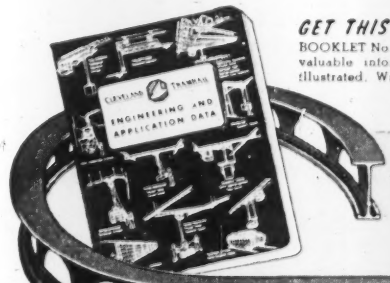
The two welding heads are secured to the load bar of the hoist. The hoist in turn is supported by the Cleveland Tramrail gantry crane. The stabilized hoist which remains absolutely rigid in any position because of the unique triangular hoisting rope arrangement, can be adjusted to any height within 4'0" limits. Welds can be made of any length up to the length of the crane runway.

Welding speed may be varied from 4 to 80 inches per minute by changing the gantry travel speed by means of push buttons on the pendant control cable. A tachometer on the cable just above the buttons keeps the operator informed of the welding speed.

The gantry crane with stabilized hoist is lighter and easier to manipulate than the usual heavy structural type of welding travel equipment. It is simple to adjust, convenient to use and very flexible in application to different kinds of work.



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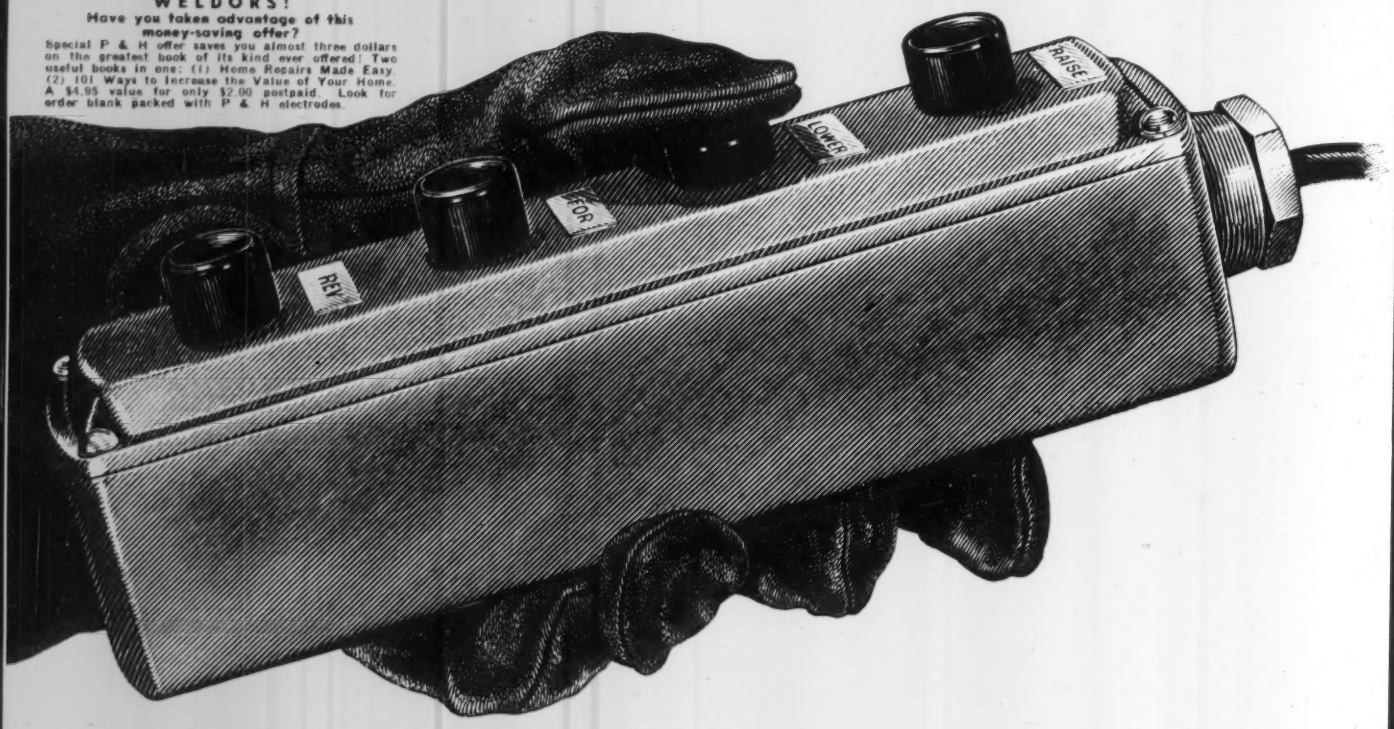

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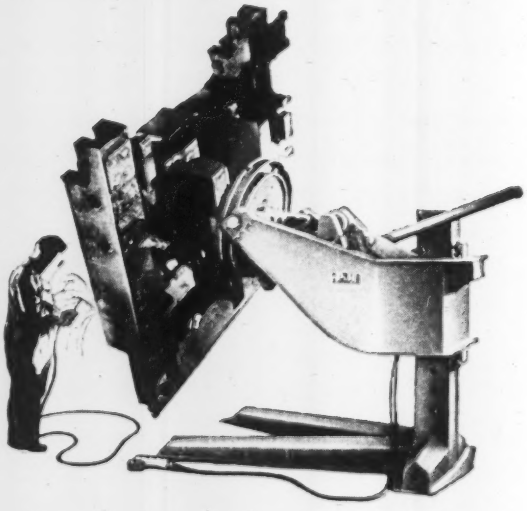

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per week. Bath has been operated 30 to 40 hours per week according to production requirements.

Bronze plating bath is maintained at 140 to 145° F. Current density used at Columbus Metal Products is between 20 and 25 amp/sq ft. However, a current density as high as 70 amp/sq ft has been used in another commercial bath for plating the bronze as fast as 0.005 inch per hour (0.001-inch-thick plates). Ductility of thick deposits (0.007 inch) is best when the current density is adjusted in range of 25 amp/sq ft. For thinner plates (less than 0.002 inch), the effect of changes in the current density appear to be negligible. Bronze anodes do not require bagging or diaphragming as copper or nickel anodes would for producing thick deposits.

Impurities — In more than a year's service, a bronze bath was treated with carbon only twice to remove organic impurities that were causing slight reductions in the ductility of the plate. Considerable tolerance for inorganic impurities is also indicated. Contaminants such as iron, zinc, and other metals, do not degrade the bronze bath.

By comparison with the old type bronze-plating bath, new process deposits better plate and is easier to operate. Old type stannate solution was operated with two sets of copper and tin anodes and two separately adjusted anode circuits[5], or else copper and tin anodes were used alternatively for short periods, with one set removed from bath while other set was being used[6]. Also, tin-anode area was critical. Too many tin anodes caused the tin to dissolve in the stannous valence form, resulting in spongy or rough plate. With too few anodes, tin stopped dissolving and alloy deposit became depleted in tin.

Tin-Rich—By reducing ratio of copper to tin dissolved in the Lustralite bath, tin-rich bronze, containing 17 to 21 per cent tin and 79 to 83 per cent copper, is deposited under the same conditions previously described for producing the "copper-rich" bronze alloy. The tin-rich bronze is known as Lustralite 20. It is slightly harder than the bronze alloy deposited for bearing applications, having a Knoop hardness of 300 to 320.

Another Advantage: It also has better leveling power or ability to fill in irregularities in surface of the basis metal. This leveling characteristic is particularly advantageous for decorative plating. Beginning with a polished steel surface measuring 11-13 rms microinches, plating 0.001 inch of the Lustralite 20 smoothened the surface to 7 rms microinches. Lustralite 20 bronze alloy is a semibright plate that is easy to buff to a mirror appearance. It is fine grained and has a banded structure. The existence of two phases has been confirmed by X-ray studies.

Speculum — Bright-speculum alloy containing 40 to 50 per cent tin and 50 to 60 per cent copper is produced in Lustralite bath by adjusting the ratio of copper and tin in bath to about 3:1. The speculum alloy called Lustralite 45, is hard, (400 Knoop). Because of its hardness, it provides excellent scratch protection. Lustralite 45 is not as ductile as Lustralite 20 or Lustralite 10. However, it is superior in leveling power to the bronze alloys. For example, a 20- to 23-rms microinch surface was smoothened to only 1 rms microinches by depositing 0.001 inch of this speculum alloy.

White Lustralite 45 alloy matches color of sterling silver and is deposited in a bright condition. Speculum is plated on items for indoor use such as architectural trim, builders' hardware, electrical appliances, flat ware and hollow ware, and on reflectors. It is considerably more tarnish resistant than silver. Thus, the reflectivity of speculum plate is far more permanent than that of silver. Initially, speculum is only slightly less reflective than silver but more reflective than chromium.

Authors acknowledge permission of City Auto Stamping Co., Battelle Memorial Institute, Columbus Metal Products Co., and Denison Engineering Co. to publish the data given in this paper.

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6. Baier, W. S., U. S. Patent 2,528,601 (Nov. 7, 1950) to City Auto Stamping Co.

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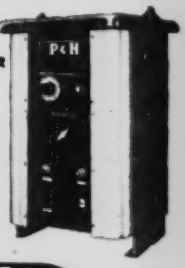

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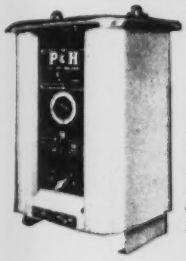

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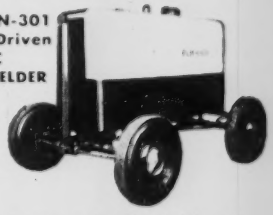

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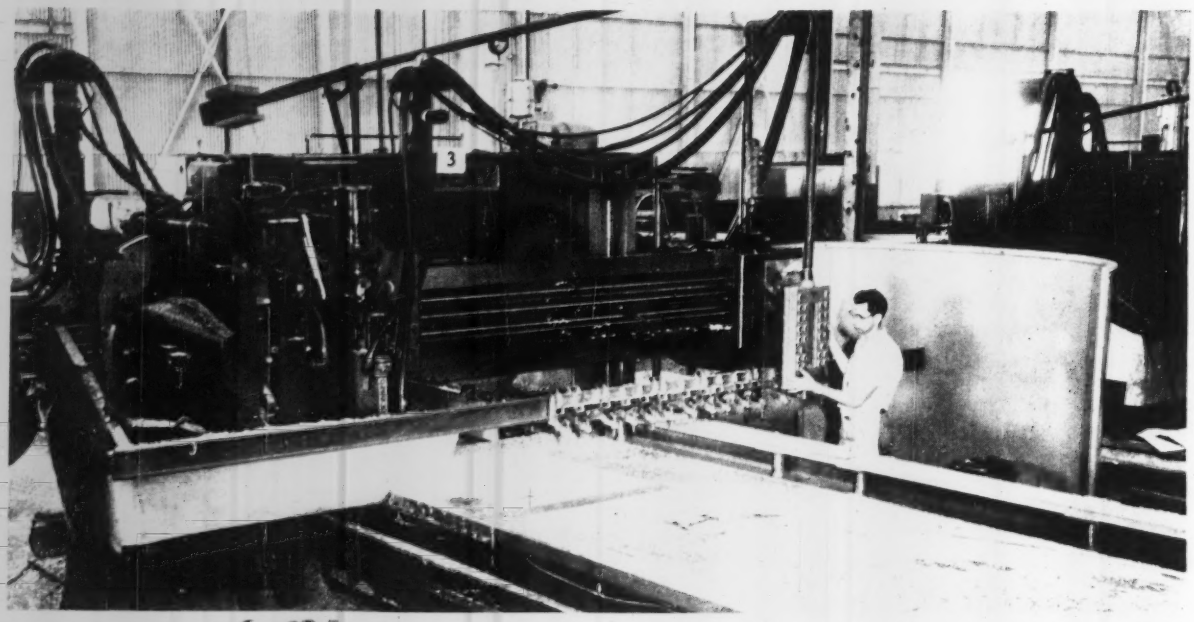
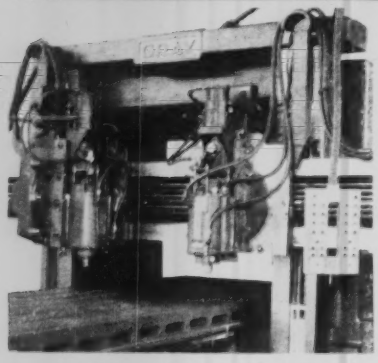


Machine mills wings and other sections from solid aluminum plate at North American. Pendant control lets operator guide cutters through their paces



Two heads swivel 20 degrees either side of vertical. Left head also swings equal amount front to back

Milling Machines

GO TO AIRCRAFT

Continuing high demand for military aircraft keeps many machine tools on the move. New skin-milling machines are virtual necessity for jet production

NEW MACHINE tools recently delivered to North American Aviation Inc., Los Angeles, will help keep the F-86F Sabrejets rolling off the production line. Machines are large aircraft skin milling units manufactured by G. A. Gray Co., Cincinnati.

Largest unit delivered to date is 22 feet wide and 67 feet long. Design features two 50-hp, 3450-rpm Onsrud heads. Both rail heads swivel 20 degrees either side of vertical. Left head has additional movement of 15 degrees front-to-back either side of vertical. One and one-half inch instantaneous quill retraction is permitted by pneumatically actuated device. Micrometer adjustment provides unusually accurate repositioning of the quills. A 4-inch over-all vertical adjustment of the heads is permissible.

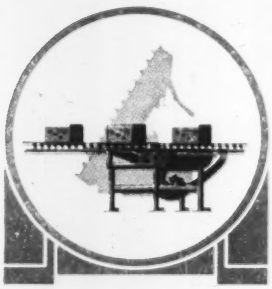
Drives and Controls—Because of the recurrence of certain specific angles, positive gear combinations are furnished to insure accurate automatic synchronization of head and table feed movements. A specialized pendant station is furnished. This unit, mounted on antifriction bearings and carefully counterbalanced, segregates table and head movement controls. Separate feed motors are furnished which may be varied, reversed or stopped from the pendant station. Complete steering control is thus available. Table feed ranges from 0.7 to 180 inches per minute are available.

There are no metal-to-metal sliding bearing contacts since non-metallic table, saddle, rail and gib bearings are featured throughout. These bearings guard against possibilities of scoring and scratching during round-the-clock high speed operation.

From the Solid—Aircraft wings and other structural sections are milled from solid aluminum plates up to 4 inches thick. Single tooth cutters are mounted on the spindle.

The spindle is in reality the motor armature. There is no gearing within the head, and only one speed, 3450 rpm, is available. The large aluminum plates are secured by vacuum chucks.

Provision is made for securing full-size templates to the machine. With the pendant station control the operator can guide the machine closely around the template.



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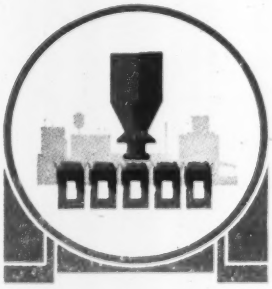
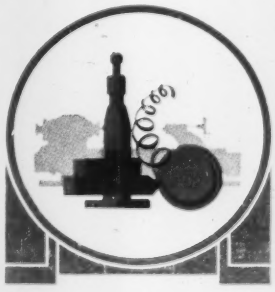
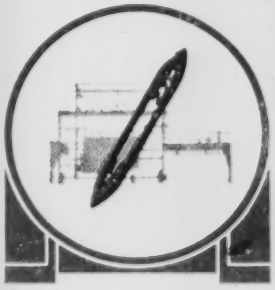


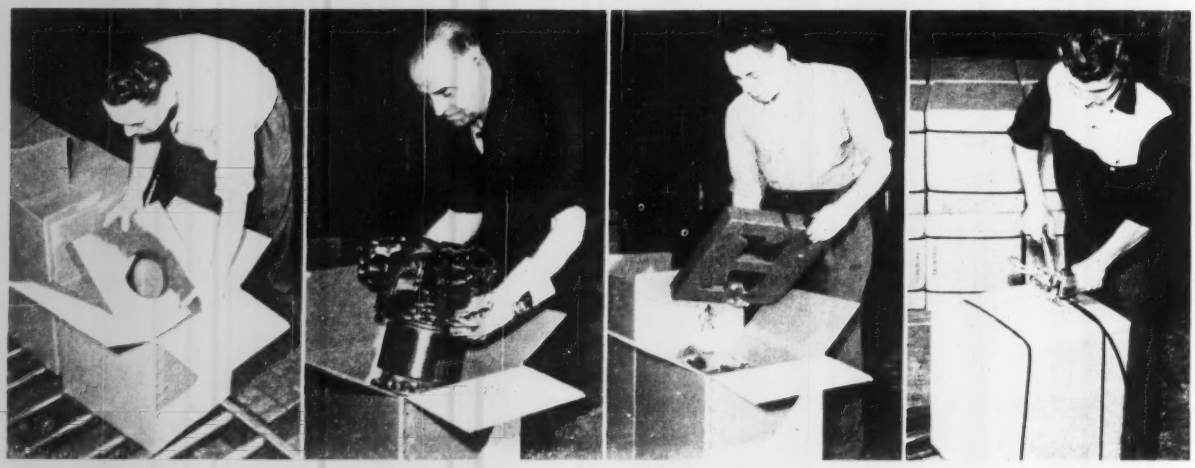
Food Processing



Metal Cutting



Textile Manufacturing



This four-step sequence shows how an aircraft engine cylinder is packed safely and quickly at Curtiss-Wright. As the part moves down the shipping line, packers (a) position preformed lower cradle; (b) lower cylinder assembly; (c) complete interior packing with addition of upper cradle; steel strap and palletize

Simplified Pack Protects Aircraft Components

Planned for use as a protector, Curtiss-Wright's packaging system has accounted for more than 100,000 shipments of aircraft parts without loss from breakage in transit

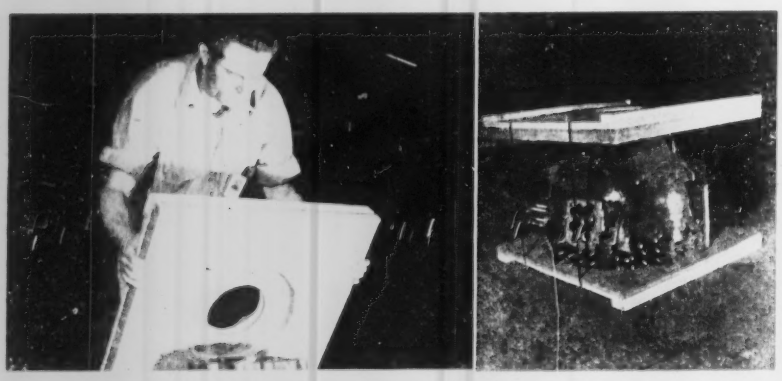
DAMAGE CLAIMS that total zero after shipment of almost $120 million worth of parts is a record calculated to engender enthusiasm in the packing system employed. This is Wright Aeronautical Division's reaction to the report that it has dispatched more than 100,000 individual shipments with a new product crating both piston engine and jet power-plant parts. All were delivered without loss of a single item through faulty packaging or breakage in transit.

Two years ago, Curtiss-Wright engine division packaging men got their initial look at the material known as Speed-Pack. At that time it was planned for use as a protector for parts of piston engine cylinders. Instead of using it for this purpose, material handling men decided to try it as a shipping material. Packaging experts were given a scrap cylinder and asked to design a shipping pack for it.

Complete Size Range — When completed, the pack was run through prescribed test series and accepted for cylinder shipping. Since then, more than 50 thousand cylinders so packed have been sent from the manufacturer's plant at Wood-Ridge, N. J., (STEEL, Dec. 11, p. 122) to military and commercial airline depots.

In addition to cylinders, more than 50 other major parts for both jet and piston-powered engines have been packed with this material. These parts range from the small sizes to some as large as complete crankcases.

Big Factor: Simplicity — Time saving when using this product is notable. Before its use, time nec-



Larger parts, such as the machined magnesium cast nose section for the Turbo Compound engine, are packed with equal facility in a variation of the cradle technique. Section is first placed on a laminated fiberboard cradle, then packer adds top cradle and binds with two steel straps to insure alignment

essary to pack each cylinder was about 10 minutes. Now this time is cut to less than 2 minutes. All other parts showed substantial time savings when the new pack was adopted.

Big factor is simplicity of handling. Here's an example: Before the new packing system started, packaging men had to use an impressive array of materials to get a piston engine nose section ready for shipment. Required were a wooden box; wooden cradles on which to locate the part; bolts, nuts, washers and spacers; bracing and hold-down details, such as wood or corrugated fillers; and, finally, they had to wrap the entire nose section in a grade of paper that would prevent contact between the engine part and the wooden box to stop damage or contamination.

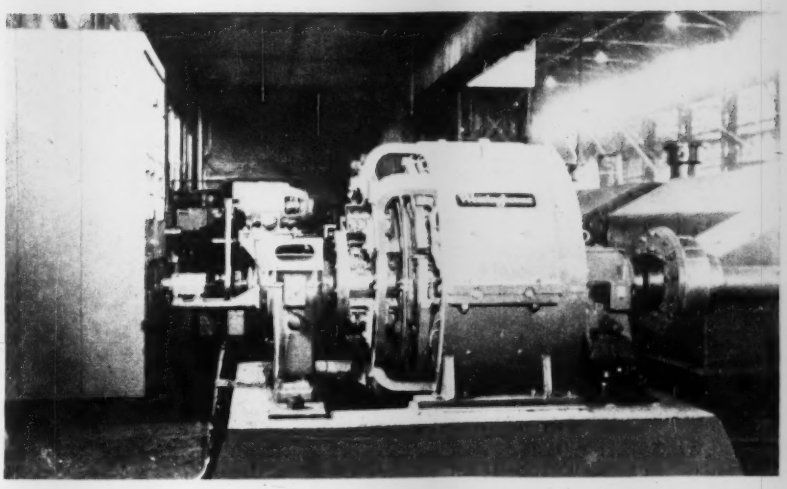
Since the advent of the quick pack system, only three elements are needed: The reinforced corrugated container, two-piece fiber pack and steel strapping.

Dimensional Stability—A product of Speed-Pack Division, McDonough-Lydon Co., Hoboken, N. J., the pack won Air Force certification two years ago. The packing material itself consists of laminated layers of industrial fiberboard chemically treated to cushion the inside of a shipping container while keeping the outside hard and achieving a negative Ph factor.

Die-cut to the particular engine part, the pack is then turned out on forms on a production-line basis. It is capable of maintaining dimensional stability during repeated shocks.

Two-Piece System — What had been a complicated system requiring many inserts in the packing box for shipping Wright cylinders is now reduced to a system employing two pieces.

A square bottom piece is die-cut with a circular cut-out in the center. This is placed in the bottom of the reinforced corrugated container. Next, the cylinder is placed in the box, the bottom of the barrel fitting into the round opening of the pack. Finally, the top piece, with its molded cut-outs fitting the cylinder top snugly, is placed above it.



Problem was teaming this 1000-hp dc motor with a 4000-hp ac motor

Magnetic Amplifiers Team AC and DC Motors

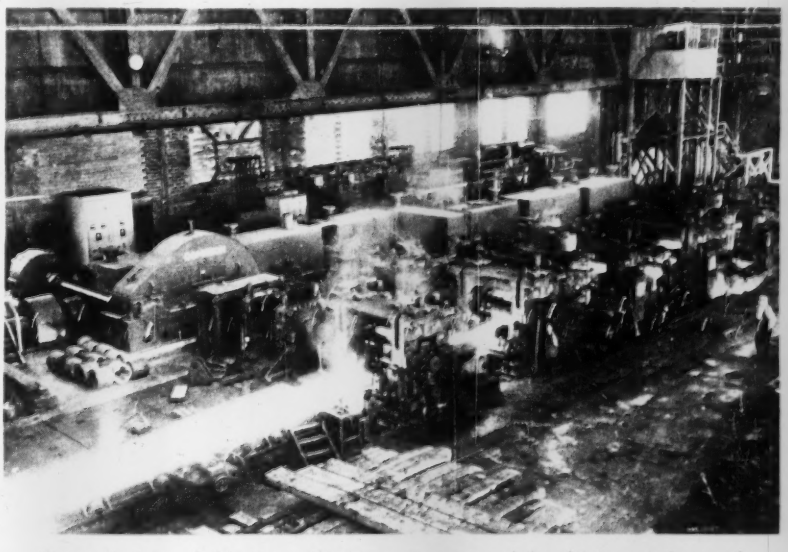
DIFFICULT rolling mill problem, caused by rather stringent military specs on billets, was solved at Algoma Steel Corp. in Canada with the help of magnetic amplifier regulators built by Westinghouse.

Finished billets were to be three inches on a side with the diagonal held to 1/64-inch tolerance. This was to be done in a six-stand mill, first five stands of which were gear-driven by a 4000-hp low-slip induction motor and the sixth by a 1000-hp dc motor.

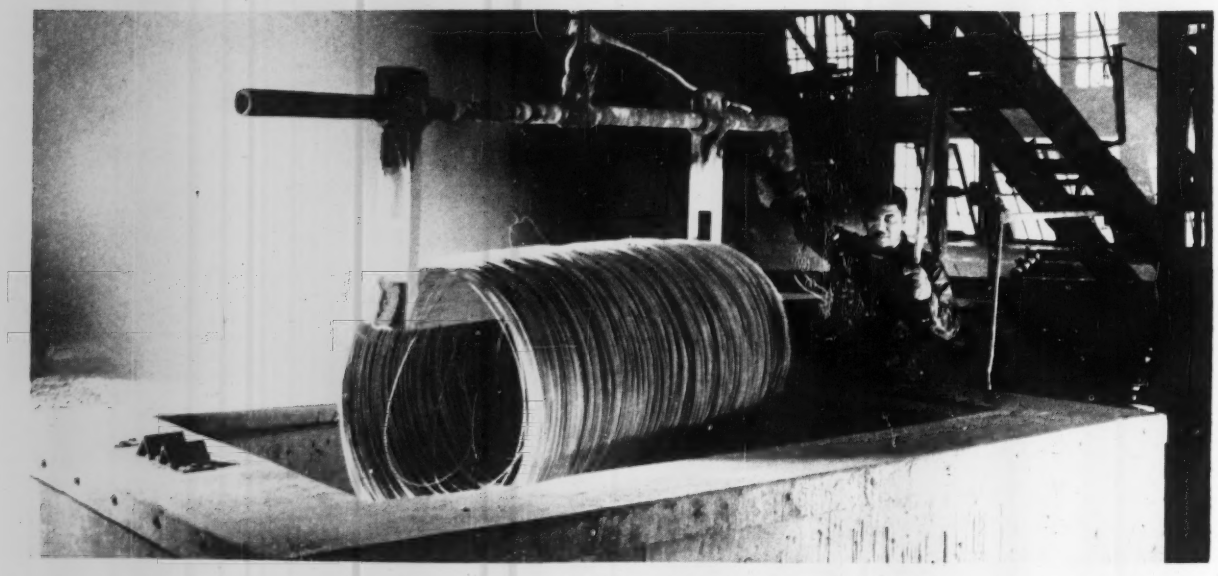
The Problem—To get these two motors to team together under all conditions of load and supply voltage was the stickler. The ac machine is much less sensitive to variations in ac line voltage than the rectifier-supplied dc machine.

To provide good speed harmony between the two, a pilot generator was placed on the shaft of each motor. Outputs of these two pilots are compared and the result fed to a two-stage magnetic amplifier which also takes ac line voltage into account.

Output of this regulating system operates on the phase-shifting circuit of the rectifier. This alters the voltage on the dc motor to make its speed match that of its running mate.



Over-all view of Algoma mill shows dc motor (left) driving sixth stand



Cradle of lime-coated rods being lowered into flash baker

Mechanical Descaling of Wire Rods Improves Coating

Low-carbon stock drawn at 1500 fpm affords improved die life. Industrial diamond qualities determined by polarized microscope

AIR patented rods are easy to descale and the higher the temperature of the rod the easier the scale is removed. This was brought out at the symposium on "The Progress of Mechanical Descaling of Rods for Wire Drawing" which highlighted the annual convention of the Wire Association, LaSalle Hotel, Chicago.

Some of the operating kinks voiced at this session were that high-carbon rods, 0.70 to 0.75 per cent carbon and cleaned by mechanical methods, cannot be drawn at conventional speeds, nor is the same die life obtained. Scale on low-carbon rods subjected to mechanical cleaning amounts to 1½ per cent of tonnage put through the machine. The galvanizing coating on wire cleaned by mechanical processes is much better than on ordinary pickled stock. Not as much lubricant is carried into the die. Revolving wire brushes or a blast of clean air is the most efficient means for scale removal under mechanical machine procedure. Good die life and low cleaning costs are secured by an Eastern mill when low-carbon rods are put through the die blocks at a speed of 1500 fpm.

Ideal Coating — V. J. Vitelli, process engineer, steel wire mills division, Colorado Fuel & Iron Corp., Trenton, N. J., in speaking on the "Drawing of Shaped Steel Wire," pointed out that the best coating and lubricant practice, as determined by appearance of the finished wire and the amount of die wear, is a heavy lime coat with a sodium stearate soap as lubricant. The soap is leaned down with slaked lime for best results; otherwise it causes wire scraping.

Drafting is more or less limited by the machines. He stated that a reduction in area of 22 to 24 per cent per hole on the intermediate holes and a finished draft of 20 per cent reduction of area on the last hole give the best results. A round first hole is necessary, he explained, because of the twist put into the wire by the flipping action of the pay-off stands. After the first round hole the wire has no further tendency to twist other than that which might be induced by bad casting.

The speaker pointed out that too great a drawing speed drastically reduces die life and results in poor quality wire. The corners become scraped and torn and show a tendency to "suck down" and become too rounded.

The number of shaped holes of drawing is dependent upon the final size, shape and physical properties desired. If the shaped steel wire is to be supplied in the bright hard drawn state rather than a heat treated finish (oil tempered or annealed), then the greater number of shaped holes generally is used. The size range of shaped steel wires drawn in 16 and 22-inch mean diameter coils varies from 0.050 to 0.150-inch.

Function of Lubricants — Leon

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to withstand pressure and reduce friction

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one cutting fluid to do 90% of all jobs

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no skin sores, no rancid odors

. . . . FILM STRENGTH
which gives you longer tool life

. . . . COOLER WORK
which can be handled bare-handed

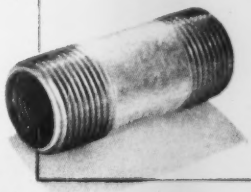
. . . . LOWER COSTS
less than 8¢ a gal., in the machine

YOU GET THEM ALL WITH

ANTISEP doubles tool life for Portland manufacturer —at 1/5 the cost of oil!

Operation consists of forming, threading and tapping stainless steel pipe nipples from 316, 340 and 303 type steel. This company switched from straight oil—costing 42¢ per gallon—to Antisep A.P. Base mixed one part to 30 with water—at a cost of about 8¢ per gallon.

LATEST REPORT— "Getting better finish —tool life doubled— at 1/5 the cost of oil formerly used." Their operators also like Antisep because there's no smoke and work comes off clean.



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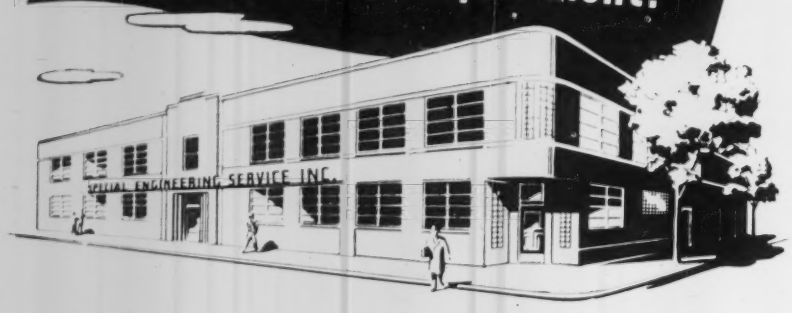

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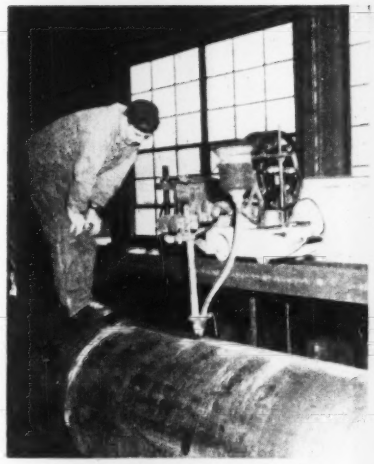
Salz, manager, lubricants division, Magnus Chemical Co., Garwood, N. J., in presenting details on "Components of Wire Drawing Lubricants," drew attention to water soluble type soaps which are excellent materials for wire drawing formulations. In addition to their lubricity characteristics, they function as emulsifiers for fats and fatty oils, rendering these materials water dispersible. He emphasized that water soluble soaps lower the surface tension of water, which is the basis for their function as wetting agents and detergents. Water insoluble soaps have higher melting points than the soluble varieties and therefore are desirable in dry drawing operations where considerable heat is developed. Both water soluble and insoluble soaps have the capacity to gel mineral oil and are used in the manufacture of petroleum greases.

Use of lime in drawing formulations is to reduce the rich lubricity of straight soap and give proper balance to the frictional characteristics required. The function of mineral oil in a drawing lubricant is to act as a carrier or dilutent for the lubricity and/or extreme pressure material blended in it and to serve as a coolant.

Heat resistant solid lubricants such as graphite, mica and talc, are used where high temperature conditions of operations do not permit the use of fats, oils or soaps. Solid lubricants may also serve along with lime and chalk as pigments in mechanically separating the wire from the die.

Chemical type extreme pressure components such as chlorinated and sulphurized compounds react with the wire during the drawing operation to form protective chemical coatings which minimize welding and seizure.

Degree of Hardness—Industrial diamonds used with tungsten carbide in the manufacture of wire dies are four times harder than tungsten carbide itself, according to C. R. Myer, manager abrasives division, Elgin National Watch Co., Elgin, Ill., in speaking on the "Use of Diamond Abrasives." About 4 tons of earth are moved per carat of diamonds obtained; last year 50 million tons of earth



Fabricating Gas Carriers

Unionmelt welding head mounted on automatic carriage makes a longitudinal butt weld at 16 ipm to fabricate this large-diameter steel pipe at Jennings Mfg. Co., Masury, O. Pipe is used in mills to carry coke-oven gas

was moved to obtain the industrial diamond output.

About 85 per cent of industrial diamonds are sold in the United States, the lowest grade coming from the Congo region. In preparing the stones for industrial abrasive use, they are first crushed and put through stacks of sieves. Material passing through the bottom sieve is processed into powders.

The speaker strongly recommended that every wiremaker should own a polarized microscope in order to determine the three qualities of the industrial diamond, namely, purity, accuracy of grading and the cubical particle shape.

Points of interest brought out during the discussion period were these: Reclamation of diamond abrasives varies from 1 to 80 per cent depending upon the work for which the abrasive was used. The average efficiency in diamond reclamation is 75 per cent of the virgin material though this varies widely. Where a die room uses 100 carats of industrial diamonds per month the recovery of diamonds will be 5 to 10 per cent of purchased material though the overall recovery might run 30 to 40 per cent depending upon the amount of waste saved.

For DEPENDABILITY

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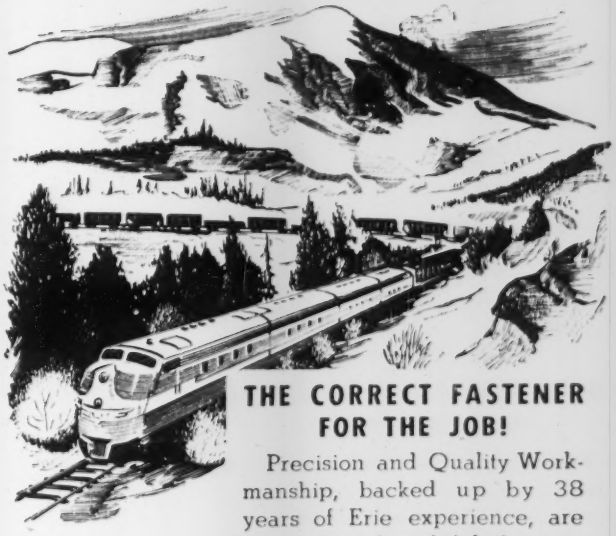
DIESEL ENGINES



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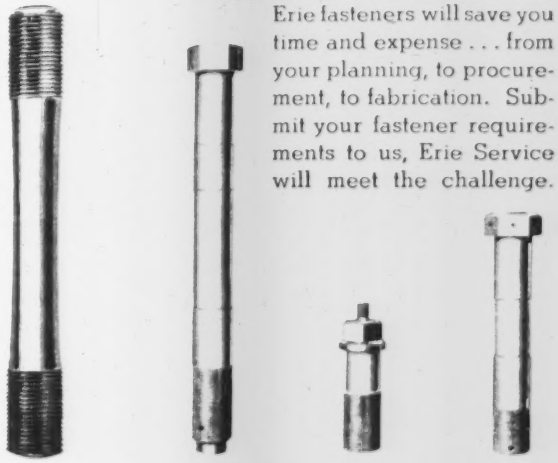

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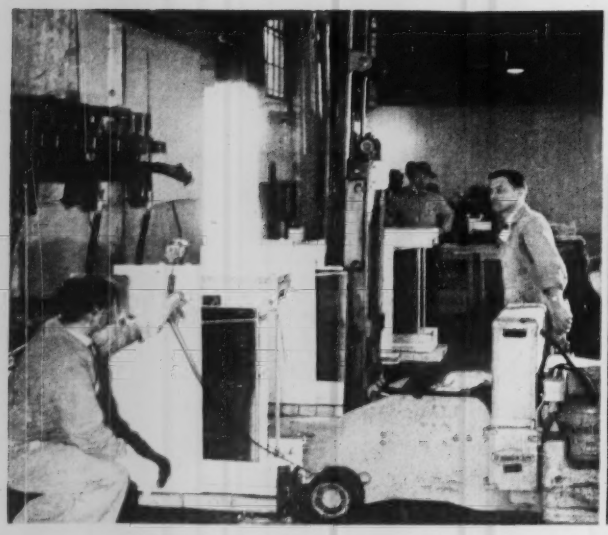
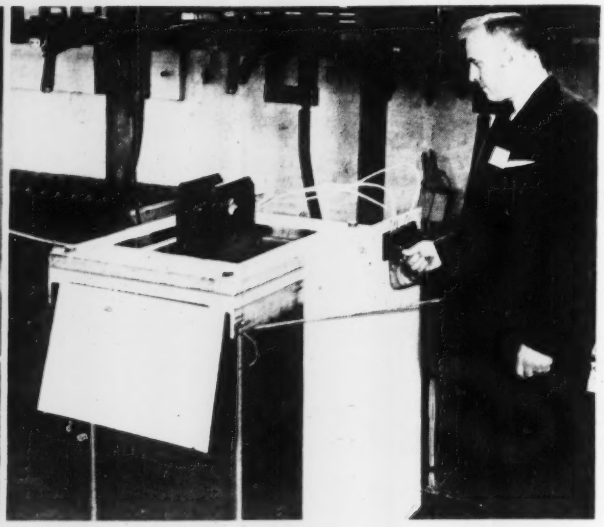


After 20 minutes inside 60-cycle induction heating coil, this 8x8x30-inch billet had reached a uniform 2200 F throughout. Engineer takes ray tube reading of surface, and thermocouples check internal temperatures



This is the largest low frequency induction heating coil yet built. R. S. Segsworth, director of research, General Engineering Co., Toronto, throws the switch. Billet reached rolling temperature in less than hour

Study Induction Heating for Big Billets

West Penn Power setup lets steel operators try 60-cycle heating for large rolling billets. Lower installation costs, ease of control, and cleanliness are prime advantages

INDUCTION heating method may speed heating of steel billets for rolling, according to engineers at West Penn Power Co., Pittsburgh. West Penn, General Engineering Co., Toronto, Ont., and Geco Inc., Cleveland, set up the experimental method at the utility's substation in Uniontown, Pa.

At three-minute intervals power input and billet temperature are recorded and projected on wall for observers

Although low frequency induction heating has been used with nonferrous metals and for limited sizes in steel forging, this is the first time that experimental equipment has been provided for 60-cycle heating of steel billets weighing as much as 1500 pounds and ranging up to sizes of 13 x 13 x 30 inches, company officials say.

Various Samples—Coils used to heat the steel are made of small copper tubing. Water flows through the tubing to cool the units. Pittsburgh area steel companies are furnishing billets during the initial tests. Several types of steel will be heated, including silicon, stainless, low carbon and tool.

In customary steel heating practice, heat is applied to the billet's surface, traveling inward by conduction. With induction heating, billets can be brought to rolling temperature in a fraction of the usual time, power company engineers believe. A 1500-pound billet should reach a uniform 2200 F throughout in 50 minutes.

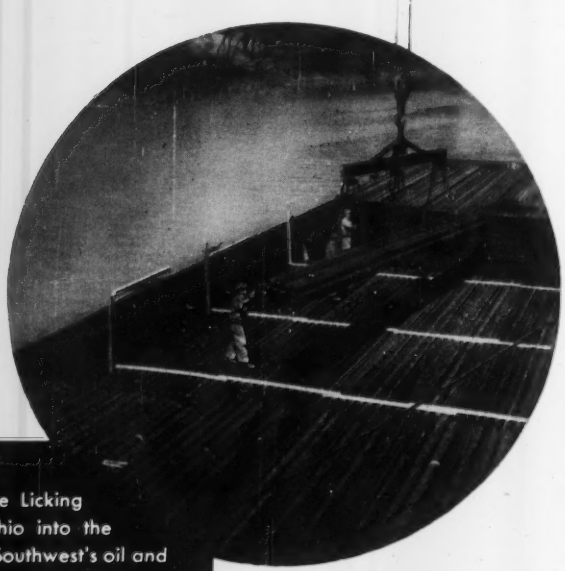
Advantages—Standard 60-cycle current at 460 volts is applied to the coils to generate the heat. No frequency conversion equipment is needed as in high frequency induction heating.

Experimental facilities at Uniontown are being made available to area steel operators for individual experiments with samples of their own steel. If this new method can be developed for tonnnage production in mills, planners say it should offer advantages of lower installation cost, ease of control, cleanliness of operaton and a reduction in space required. Scale losses should be materially reduced because of the shorter time the surface of the steel is held at high temperatures.

UNITED ENGINEERING AND FOUNDRY COMPANY

PITTSBURGH, PENNSYLVANIA

LINE PIPE SAILS AFTER OIL



From a new dock on the Licking River, then down the Ohio into the Mississippi and on to the Southwest's oil and gas fields, glide many barges of Newport high-quality line pipe. To make this fine pipe, hot-rolled steel in coil is fed through a conditioner and an automatic roll train to the electric resistance welder. Annealed, cooled, trimmed, straightened, and automatically cut to length, pipe is finally inspected and tested under high pressure. Fine steelmaking for 68 years ensures for Newport line pipe the same excellence that makes this the favorite mill of so many purchasers of various steel products.

PRODUCTS OF NEWPORT STEEL

Hot-Rolled Steel in Coil
Hot-Rolled Pickled Steel in Coil
Electric Weld Line Pipe
Hot-Rolled Sheets
Galvanized Sheets
Galvannealed Sheets
Colorbond Sheets
Hot-Rolled Pickled Sheets
Electrical Sheets
Alloy Sheets
Roofing and Siding
Eave Trough and Conductor Pipe
Culverts

ECONOMICAL WATERAIL DELIVERY

Newport Steel CORPORATION
NEWPORT, KENTUCKY

STEEL
December 21, 1953

Market Outlook

THE steel industry will take a holiday this week. With peace on earth at the Christmas season for the first time since 1949 there's no need now to forego a silent night or two in the steel mills.

The Christmas holiday will vary in length from company to company and plant to plant. In some plants there'll be a slowdown for Chirstmas Eve and Day, with a resumption of full activity on Dec. 26. Others will make the holiday into a long week end and not go back to work until Dec. 28.

SLOWDOWN—Consequently, this week will bring the lowest steel ingot production rate of the year. The rate will be even lower than the year's latest low mark recorded in the week ended Dec. 19 when production of steel for ingots and castings receded to 83.5 per cent of capacity from the preceding week's 85.

TWO INCENTIVES— Absence of a war urgency is not all that is encouraging steel plants to take a Christmas holiday. Another incentive is the surprisingly slow pace at which orders for first-quarter delivery are coming in from customers. Steel sales executives who a few weeks ago thought orders for January delivery would turn upward after the tapering trend at the end of 1953 are now revising their predictions to a pickup in February, with further improvement in March.

HARD TO MEASURE— Making it difficult for steel companies to gage demand very far in the future is the swing to last-minute ordering by customers. When steel demand exceeded supply, customers ordered 60 to 90 days or more in advance, and producers could be reasonably certain how strong demand was going to be in the next quarter.

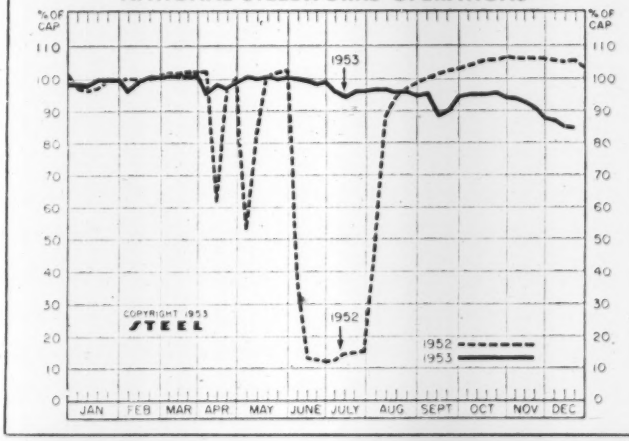
The general decline in demand for steel has extended far enough that now for the first time in a long while there's report of a slight softening of pressure for wide flange steel beams, outstanding as the last steel product to show a sign of easing.

ROOM FOR MORE— On most steel products you still can get on the books for January delivery. This applies even to cold-rolled carbon sheets, a widely used form of steel, and a big tonnage item in the automobile industry, the biggest consumer of steel.

A NEW TWIST— Drop in demand for steel does not mean that steel consumption has dropped as much. Now that users know they can get steel promptly they are reducing their protective inventories of steel. If this inventory reduction runs far enough into 1954, it's possible that steel consumption that year may exceed steel production. In the last few boom years when steel was hard to get, consumers bought more steel than they used. They put considerable amounts into protective inventories. Now they'll live off them for awhile, in addition to new tonnages from mills. Consequently, it's possible that metalworking plants will use more steel in 1954 than they'll buy that year.

A CLUE?— Most surveys indicate there'll be pretty good business in 1954. The outlook's encouraging, says a tool steel producer. It considers its tool steel sales to be a barometer of market conditions one or two months ahead. Sales, low in November and December, are picking up for late January and February.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

(Percentage of capacity engaged at leading production points)

	Week Ended Dec. 19	Change	Same Week 1952	Same Week 1951
Pittsburgh	90	- 1*	104	99
Chicago	91	- 2*	111	97.5
Mid-Atlantic	85	- 2	101	101
Youngstown	82	- 6	106	106
Wheeling	91	+ 8	100	103
Cleveland	70	- 7	110.5	106.5
Buffalo	88	- 12	106.5	104
Birmingham	70	-26.5	108.5	105
New England	77	- 1	89	88
Cincinnati	73	- 2	93	101
St. Louis	88	+ 4.5	101	87
Detroit	97	0.5	103.5	110
Western	88	2	107	103.5
Estimated National Rate	83.5	1.5	105.5	104.5

*Change from preceding week's revised rate.

Weekly steelmaking capacity is estimated at 2,254,459 net tons in 1953; 2,077,040 tons in 1952; 1,999,034 tons in 1951.

The Metalworking Outlook—p. 29 Technical Outlook—p. 77

PRICE INDEXES AND COMPOSITES

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics) Week Ended Dec. 15

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them write to STEEL.

Rails, standard, No. 1	$4.400	Bars, H.R., stainless, 303 (lb)	$0.415	Strip, C.R., stainless, 430 (lb)	$0.415	Tin plate, hot-dipped, 1.25 lb	$8.433
Rails, light, 40 lb	5.767	Bars, H.R., alloy	$8.675	Strip, H.R., carbon	4.975	Tin plate, electrolytic, 0.25 lb	7.133
Tie Plates	5.125	(lb)	0.418	Pipe, black, buttweld (100 ft)	14.454	Black plate, can making quality	6.233
Axles, railway	7.250	Bars, H.R., carbon	4.873	Pipe, galv., buttweld (100 ft)	17.731	Wire, drawn, carbon	7.713
Wheels, freight car, 33 in. (per wheel)	47.000	Bars, reinforcing	4.750	Pipe, line (100 ft)	141.989	Wire, drawn, stainless, 430 (lb)	0.545
Plates, carbon	4.550	Bars, C.F., carbon	7.860	Casing, oil well, carbon (100 ft)	149.516	Bale ties (bundle)	5.653
Structural Shapes	4.383	Bars, C.F., alloy	11.075	Casing, oil well, alloy (100 ft)	214.113	Nails, wire, 8d common	7.486
Bars, tool steel, carbon (lb)	0.415	Bars, C.F., stainless, 302 (lb)	0.433	Tubes, boiler (100 ft)	‡	Wire, barbed (80-rod spool)	6.847
Bars, tool steel, alloy, oil hardening die (lb)	0.505	Sheets, H.R., carbon	4.765	Tubing, mechanical, carbon (100 ft)	‡	Woven wire fence (20-rod roll)	16.174
Bars, tool steel, H.R. alloy, high speed W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.69 (lb)	1.135	Sheets, C.R., carbon	5.904	Tubing, mechanical, stainless, 304 (100 ft)	161.193		
Bars, tool steel, H.R. alloy, high speed W 18, Cr 4, V 1 (lb)	1.730	Sheets, galvanized	6.945				
		Sheets, C.R., stainless, 302 (lb)	0.548				
		Sheets, electrical	9.183				
		Strip, C.R., carbon	7.243				

‡ Not available.

FINISHED STEEL PRICE INDEX (Bureau of Labor Statistics)

	Dec. 15 1953	Dec. 8 1953	Month Ago	Nov. Average
(1947-1949=100)	141.5	141.4	141.4	141.4

STEEL's FINISHED STEEL PRICE INDEX

	Dec. 17 1953	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Index (1935-39 av.=100)	189.74	189.74	189.91	181.31	151.86
Index in cents per lb	5.140	5.140	5.145	4.912	4.114

STEEL's ARITHMETICAL PRICE COMPOSITE*

	Dec. 17 1953	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Finished Steel, NT	$114.64	$114.64	$115.18	$110.98	$95.50
No. 2 Fdry. Pig Iron, GT	56.54	56.54	56.54	55.04	46.09
Basic Pig Iron, GT	56.04	56.04	56.04	54.66	46.29
Malleable Pig Iron, GT	57.27	57.27	57.27	55.77	47.41
Steelmaking Scrap, GT	32.00	33.00	35.00	43.00	43.25

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 84, of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

COMPARISON OF PRICES

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	Dec. 17 1953	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh	4.15	4.15	4.15	3.95	3.45
Bars, H.R., Chicago	4.15	4.15	4.15	3.95	3.35
Bars, H.R., del. Philadelphia	5.302	5.302	5.302	4.502	3.79
Bars, C.F., Pittsburgh	5.20	5.20	5.20	4.925	3.95
Shapes, Std., Pittsburgh	4.10	4.10	4.10	3.85	3.275
Shapes, Std., Chicago	4.10	4.10	4.10	3.85	3.25
Shapes, deld., Philadelphia	4.38	4.38	4.38	4.13	3.48
Plates, Pittsburgh	4.10	4.10	4.10	3.90	3.50
Plates, Chicago	4.10	4.10	4.10	3.90	3.40
Plates, Coatesville, Pa.	4.35	4.35	4.35	4.35	3.75
Plates, Sparrows Point, Md.	4.10	4.10	4.10	3.90	3.45
Plates, Claymont, Del.	4.55	4.55	4.55	4.35	3.95
Sheets, H.R., Pittsburgh	3.925	3.925	3.925	3.775	3.275
Sheets, H.R., Chicago	3.925	3.925	3.925	3.775	3.25
Sheets, C.R., Pittsburgh	4.775	4.775	4.775	4.575	4.00
Sheets, C.R., Chicago	4.775	4.775	4.775	4.575	4.00
Sheets, C.R., Detroit	4.975	4.975	4.975	4.775	4.20
Sheets, Galv., Pittsburgh	5.275	5.275	5.275	5.075	4.40
Strip, H.R., Pitts.	4.425	4.425	4.425	3.75-4.225	3.275
Strip, H.R., Chicago	3.925	3.925	3.925	3.725	3.25
Strip, C.R., Pittsburgh	5.45	5.45	5.45-5.95	5.10-5.80	4.375
Strip, C.R., Chicago	5.70	5.70	5.70	5.35	4.00
Strip, C.R., Detroit	5.45-6.05	5.45-6.05	5.45-6.05	5.30-6.05	4.20
Wire, Basic, Pitts.	5.525	5.525	5.525	5.10-5.225	4.325
Nails, Wire, Pittsburgh	6.55	6.55	6.55	6.20-6.85	5.775
Tin plate (1.50 lb), box, Pitts.	$8.95	$8.95	$8.95	$8.95	$6.70

SEMIFINISHED STEEL					
Billets, forging, Pitts. (NT)	$75.50	$75.50	$75.50	$70.50	$61.00
Wire rods, ½-⅝", Pitts.	4.525	4.525	4.525	4.425	3.775

PIG IRON, Gross Ton	Dec. 17 1953	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bessemer, Pitts.	$57.00	$57.00	$57.00	$55.50	$47.00
Basic, Valley	56.00	56.00	56.00	54.50	46.00
Basic, deld. Phila.	60.75	60.75	60.75	59.25	50.17
No. 2 Fdry, Pitts.	56.50	56.50	56.50	55.00	46.50
No. 2 Fdry, Chicago	56.50	56.50	56.50	55.00	46.25
No. 2 Fdry, Valley	56.50	56.50	56.50	55.00	46.50
No. 2 Fdry, deld. Phila.	61.25	61.25	61.25	59.75	50.67
No. 2 Fdry, Birm.	52.88	52.88	52.88	51.38	43.38
No. 2 Fdry (Birm.) del. Cin.	60.43	60.43	60.43	58.93	49.09
Malleable, Valley	56.50	56.50	56.50	55.00	46.50
Malleable, Chicago	56.50	56.50	56.50	55.00	46.50
Ferromanganese, Duquesne	200.00†	200.00†	200.00†	228.00*	163.00*

*78-82% Mn, per gross ton, Etna, Pa. †74-76% Mn, per net ton.

SCRAP, Gross Ton (Including broker's commission)					
No. 1 Heavy Melt, Pitts.	$33.50	$33.50	$36.50	$44.00	$42.75
No. 1 Heavy Melt, E. Pa.	31.00	33.00	35.00	41.50	45.25
No. 1 Heavy Melt, Chicago	31.50	32.50	33.50	42.50	41.75
No. 1 Heavy Melt, Valley	29.50	32.50	35.50	44.00	42.75
No. 1 Heavy Melt, Cleve.	29.50	30.50	33.50	43.00	42.25
No. 1 Heavy Melt, Buffalo	29.50	30.50	34.50	43.00	48.50
Rails, Rerolling, Chicago	42.50	46.50	46.50	52.50	69.50
No. 1 Cast, Chicago	33.50	33.50	34.50	45.00	70.50

COKE, Net Ton					
Beehive, Furn. Connlsvl.	$14.75	$14.75	$14.75	$14.75	$14.50
Beehive, Fdry. Connlsvl.	16.75	16.75	16.75	17.00	17.00
Oven Fdry, Chicago	24.50	24.50	24.50	24.50	20.40

NONFERROUS METALS

(Cents per pound, carlots, except as otherwise noted)

PRIMARY METALS AND ALLOYS

Aluminum: 99+%, ingots 21.50, pigs 20.00 10,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 12% Si, 23.30; No. 43, 5% Si, 23.10; No. 142, 4% Cu, 24.40; No. 195, 4.5% Cu, 0.8% Si, 23.70; No. 214, 3.8% Mg, 24.40; No. 356, 7% Si, 0.3% Mg, 23.20.

Antimony: R.M.M. brand, 99.5% 28.50. Lone Star brand, 28.00, f.o.b. Laredo, Texas, in bulk. Foreign brands, 99.5%, 25.50-26.00 New York, duty paid, 10,000 lb or more.

Beryllium: 97%, lump or beads, $71.50 per lb f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $72.75 per lb of contained Be, f.o.b. Reading, Pa.

Beryllium Copper: 3.75-4.25% Be, $40.00 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. Reading, Pa. or Elmore, O.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $2.00 per lb deld.

Cobalt: 97-99%, $2.60 per lb for 550 lb keg, $2.62 per lb for 100 lb case; $2.67 per lb under 100 lb.

Columbium: Powder, $75.00 per lb, nom.

Copper: Electrolytic 29.50-30.00 deld. Conn. Valley, 29.625-30.125 deld. Midwest; Lake 30.00 deld.; Fire refined 29.75 deld.

Germanium: 99.9%, $295 per lb nom.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $165-$175 per troy oz.

Lead: Common 13.30, chemical 13.40, corroding 13.40, St. Louis, New York basis, add 0.20.

Lithium: 98%, $11-$14 per lb, depending on quantity.

Magnesium: 99.8% standard ingots 27.00, 10,000 lb or more, f.o.b. Freeport, Tex. Sticks, 1.3 in. dia., 45.00, 100 to 4999 lb.

Magnesium Alloys: AZ91B 30.50; AZ91C and alloys C, H, G and R 32.50; alloy M 34.50, 10,000 lb or more.

DAILY NONFERROUS PRICE RECORD

	Price Dec. 17	Change	Previous Price	Nov. Avg.	Oct. Avg.	Dec. 1952 Avg.
Copper	29.50-30.00	Oct. 29	29.00-30.00	29.750	29.808	24.500
Lead	13.30	Sept. 16	13.80	13.300	13.300	13.925
Zinc	10.00	Sept. 11	10.50	10.000	10.000	12.500
Tin	86.00	Dec. 10	86.25	83.352	81.096	121.500
Nickel	60.00	Jan. 14	56.50	60.000	60.000	56.500
Aluminum	21.50	July 15	20.50	21.500	21.500	20.000
Magnesium	27.00	Mar. 9	24.50	27.000	27.000	24.500

Quotations in cents per pound based on: Copper, deld. Conn. Valley; Lead, common grade, deld. St. Louis; Zinc, prime western, E. St. Louis; Tin, Straits, deld. New York; Nickel, electrolytic cathodes, 99.9%, base size at refinery unpacked; Aluminum, primary ingots, 99+%, deld.; Magnesium, 99.8%, Freeport, Tex.

Mercury: Open market, spot, New York, $185-$188 per 76-lb flask.

Molybdenum: Powder 99% hydrogen reduced $3.40 per lb; pressed ingot $4.06 per lb; sintered ingot $5.53 per lb.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 60.00; 25-lb pigs 62.65; "XX" nickel shot 63.65; "F" nickel shot or ingots for addition to cast iron, 60.00, prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 0.92.

Osmium: $140-$150 per troy oz. nom.

Palladium: $22-$24 per troy oz.

Platinum: $91-$93 per troy oz. from refineries.

Radium: $16-$21.50 per mg radium content, depending on quantity.

Rhodium: $125 per troy oz.

Ruthenium: $75-$80 per troy oz.

Selenium: 99.5%, $4.25-$4.75 per lb.

Sodium: 16.50, carlots; 17.00 l.c.l.

Tantalum: Sheet, rod $39.00 per lb; powder $33.50 per lb.

Tellurium: $1.75 per lb.

Thallium: $12.50 per lb.

Tin: Straits, New York, 86.00.

Titanium: Sponge, 99.3+%, $5 per lb.

Tungsten: Powder, 98.8%, carbon reduced, 1000 lb lots $5.35 per lb f.o.b. shipping point; less than 1000 lb $5.50; 99+% hydrogen reduced, $8.30. Treated ingots $10.43.

Zinc: Prime western 10.00, brass special 10.25, intermediate 10.50, E. St. Louis, freight allowed over 0.50 per pound. High grade 11.35, special high grade 11.50, die casting alloy ingot 14.50, deld.

Zirconium: Sponge $14.00 per lb; powder 100 lb or more $7.00; less than 100 lb $8.00.

(Note: Chromium, manganese and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston Alloys 20.75-21.75; No. 12 foundry alloy (No. 2 grade) 19.75-20.75; 5% silicon alloy, 0.60 Cu max., 22.75-23.50; 13 alloy, 0.60 Cu max., 22.75-23.50; 195 alloy 21.50-22.50; 108 alloy 20.75-21.75; steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 21.00-22.00; grade 2, 20.00-21.00; grade 3, 18.75-19.75; grade 4, 17.25-18.25.

Brass Ingot: Red brass, No. 115, 24.50; tin bronze No. 225, 35.25, No. 245, 29.50; high-leaded tin bronze, No. 305, 28.75; No. 1 yellow, No. 405, 20.75; manganese bronze No. 421, 25.25.

Magnesium Alloy Ingot: AZ63A, 31.50; AZ91B, 31.50; AZ91C, 32.00; AZ92A, 31.50.

NONFERROUS MILL PRODUCTS

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 100,000 lb lots, 35.36; 30,000 lb lots, 35.48; l.c.l. 35.98. Weatherproof, 100,000 lb 36.28; 30,000 lb, 36.53; l.c.l., 37.03. Magnet wire deld., 15,000 lb or more 41.83; l.c.l., 42.58.

LEAD

(Prices to jobbers f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more $18.50 per cwt; pipe, full coils $18.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb; 100,000 lb and over, f.o.b. mill) Sheets $15; sheared mill plate, $12; strip, $15; wire, $10; forging billets, $6; hot-rolled and forged bars, $6.

ZINC

Sheets 23.00, f.o.b. mill, 36,000 lb and over. Ribbon zinc in coils, 19.00-20.50, f.o.b. mill, 36,000 lb and over. Plates 19.00-22.25.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheet, C.R., ..	86.5	67.5	92.5
Strip, C.R. ...	92.5	70.5	98.5
Plate, H.R. ..	84.5	66.5	90.5
Rod, Shapes ..	82.5	65.5	88.5
Seamless Tubes	115.5	100.5	137.5
Shot, Blocks		60.0	....

ALUMINUM

(30,000 lb base, freight allowed over 499 lb)

Sheets and Circles: 2S and 3S mill finish c.l.

Thickness Range, Inches	Widths or Diameters, In., Inc.	Flat Sheet*	Coiled Sheet	Coiled Sheet Circle†
0.249-0.136	12-48	33.9	...	...
0.135-0.096	12-48	34.4	...	...
0.095-0.077	12-48	35.1	32.7	37.5
0.076-0.061	12-48	35.7	32.9	37.7
0.060-0.048	12-48	36.1	33.2	38.1
0.047-0.038	12-48	36.6	33.6	38.4
0.037-0.030	12-48	37.0	34.0	39.1
0.029-0.024	12-48	37.6	34.3	39.6
0.023-0.019	12-36	38.3	35.1	40.4
0.018-0.017	12-36	39.1	35.7	41.3
0.016-0.015	12-36	40.0	36.5	42.5
0.014	12-24	41.0	37.5	43.8
0.013-0.012	12-24	42.1	38.2	44.8
0.011	12-24	43.1	39.4	46.4
0.010-0.0095	12-24	44.3	40.5	48.0
0.009-0.0085	12-24	45.6	41.9	50.0
0.008-0.0075	12-24	47.1	43.1	51.8
0.007	12-18	48.6	44.6	54.1
0.006	12-18	50.2	46.0	59.1

* 72-180 in. lengths. † 26 in. max. dia.

ALUMINUM

Plates and Circles: Thickness 0.250-3.0 in., 24-60 in. widths or dia., 72-240 in. lengths.

Alloy	Plate Base	Circle Base
2S-F, 3S-F	32.4	36.3
50S-F	33.5	37.4
4S-F	34.5	39.1
52S-F	36.2	40.9
61S-T6	37.4	41.5
24S-T4*	39.3	45.4
75S-T6*	47.1	53.7

* 24-48 in. widths or dia., 72-180 in. lengths.

ALUMINUM

Screw Machine Stock: 5000 lb and over.

Dia. (in.) or	Round		Hexagonal	
across flats	11S-T3	17S-T4	11S-T3	17S-T4
Drawn				
0.125	59.6	57.9	...	...
0.156-0.172	50.6	48.9	...	...
0.188	50.6	48.9	...	62.4
0.219-0.234	47.9	46.2	...	...
0.250-0.281	47.9	46.2	...	59.5
0.313	47.9	46.2	...	56.8
Cold-finished				
0.375-0.531	46.6	44.9	56.2	53.4
0.563-0.688	46.6	44.9	53.4	50.2
0.750-1.000	45.5	43.8	48.9	47.3
1.063	45.5	43.8	...	45.7
1.125-1.500	43.8	42.1	47.3	45.7
Rolled				
1.563	42.7	41.0	...	...
1.625-2.000	42.1	40.4	...	44.1
2.125-2.500	41.1	39.4	...	...
2.750-3.375	39.9	38.2	...	...

ALUMINUM

Forging Stock: Round, Class 1, 42.05-32.76, in specific lengths 36-144 in., diameters 0.375-8 in.; rectangles and squares, Class 1, 49.2 to 37.6 in random lengths 0.375-4.0 in. thick, widths 0.750-10.0 in.

Pipe: A.S.A. Schedule 40, alloy 63S-T6, 20 ft length, plain ends, 30,000 lb base, per 100 ft.

Nom. pipe size, in.		Nom. pipe size, in.	
¾	$15.05	2	$ 46.30
1	23.65	4	127.70
1¼	32.00	6	228.50
1½	38.25	8	343.80

MAGNESIUM

Sheet: AZ31, commercial grade, 0.032-in. 108.00, 0.064-in. 81.00, 0.125-in. 71.00, 30,000 lb and over, f.o.b. mill.

Plate: Hot-rolled, AZ31, 53.00, 20,000 lb or more 0.188-1.0 in. thick, widths to 48 in., lengths to 144 in.; raised pattern floor plate, 60.00, 20,000 lb or more, ¼-in. thick, widths 24-48 in., lengths 60-144 in.

Extrusion Stock: AZ31, Rectangles, ¼ x 2 in. 69.20, 1 x 4 in. 63.00. Rod, 1 in. 66.00, 2 in. 62.50. Tubing, 1 in. OD x 0.065-in. 87.00. Angles, 1 x 1 x ⅛-in. 72.90, 2 x 2 x ¼-in. 67.00. Channels, 5 in. 67.80. I-Beams, 5 in. 66.20.

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES f		
	Sheet, Strip, Plate	Rod	Wire	Seamless Tube	Clean Heavy	Rod Ends	Clean Turnings
Copper	48.38b	45.98c	....	48.44	26.000	26.000	25.250
Yellow brass	41.72	41.66	42.26	44.63	19.750	19.500	18.000
Red Brass, 85%	45.44	45.38	45.98	48.25	23.000	22.750	22.250
Low Brass, 80%	44.47	44.41	45.01	47.28	22.125	21.875	21.375
Naval Brass	45.76	40.07	52.80	48.92	18.250	18.000	17.500
Commercial Bronze, 90%	46.95	46.89	47.49	49.51	23.875	23.625	23.125
Nickel Silver, 10%	55.36	59.43g	57.69	....	23.625	23.375	11.813
Phosphor Bronze, A, 5%	66.58	67.08	67.08	68.23	26.125	25.875	24.875
Silicon Bronze	52.71	51.90	52.75	70.11e	25.125	24.875	24.125
Manganese Bronze	49.48	43.62	54.06	....	18.250	18.000	17.500
Muntz Metal	43.96	39.77	....	....	18.625	18.375	17.875

a Cents per lb, f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e 3% silicon. f. Prices in cents per lb for less than 20,000 pounds, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb. g. Leaded.

NONFERROUS SCRAP

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots)

Aluminum: 2S clipping 13.00; low copper clippings 13.00; mixed clippings 10.00; old sheet 10.00; borings and turnings 6.50-7.00; pistons and struts 7.00; crankcases 10.00; industrial castings 10.00.

Copper and Brass: Heavy copper and wire, No. 1 24.00-23.50; No. 2 copper 21.00-21.50; light copper 19.00-19.50; No. 1 composition red brass 17.00; No. 1 composition turnings 16.50; mixed brass turnings 10.50; new brass clippings 17.00-17.50; No. 1 brass rod turnings 12.00-12.50; light brass 10.00; heavy yellow brass 12.50-13.00; new brass rod ends 14.50; auto radiators, unsweated, 12.50; cocks and faucets 14.50-15.00; brass pipe 16.00.

Lead: Heavy 10.50; battery plate 5.50-5.75; linotype and stereotype 12.50; electrotype 11.00; mixed babbitt 12.00-12.50.

Magnesium: Clippings 20.00-21.00; clean castings 19.00-20.00; iron castings, not over 10% removable Fe, 18.00-19.00.

Monel: Clippings 24.00-26.00; old sheet 22.00-24.00; turnings 18.00-20.00; rods 24.00-26.00.

Nickel: Sheets and clips 70.00; rolled anodes 70.00; turnings 40.00; rod ends 70.00.

Tin: No. 1 pewter 40.00-45.00; block tin pipe 65.00-67.00; No. 1 babbitt 37.00-38.00.

Zinc: Old zinc, 3.50; new die cast scrap, 3.50; old die cast scrap, 3.25.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Aluminum: 2S, 3S clippings 14.00-14.50; 51S, 52S clippings 14.00-14.50; 14S, 17S, 24S clippings 13.00-12.50; mixed clippings 12.75-13.50; old sheet 11.00-11.50; old cast 11.00-11.50; clean old cable, free of steel, 14.00-14.50; borings and turnings 11.50-12.00.

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 42.00; light scrap 37.00.

Copper, Brass: No. 1 copper 24.00-24.50; No. 2 copper 22.50; light copper 21.00; refinery brass (60% copper) per dry copper content 19.50; auto radiators, nominal.

INGOT MAKERS' BUYING PRICES

(Cents per pound, carlots, delivered)

Copper, Brass: No. 1 copper 25.00; No. 2 copper 23.50; light copper 22.00; No. 1 composition borings 17.00-18.00; No. 1 composition solids 17.50-18.50; heavy yellow brass solids 13.50-14.00; yellow brass turnings 12.50-12.75; radiators 13.50-14.00.

PLATING MATERIALS

(F.o.b. shipping points, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes $2.15 per lb.

Copper: Flat-rolled 45.04, oval 44.54, 2000-5000 lb; electrodeposited 39.78, cast 42.04, 5000-10,000 lb lots.

Nickel: Depolarized, less than 500 lb 92.00; 500-4999 lb 88.00; over 5000 lb 86.00.

Tin: Bar or slab, less than 200 lb $1.045; 200-499 lb $1.03; 500-999 lb $1.025; 1000 lb or more $1.02.

Zinc: Bar 18.50, bar or flat top 17.50, ton lots.

CHEMICALS

Cadmium Oxide: $2.15 per lb, in 100 lb drums.

Chromic Acid: Less than 2000 lb 29.00; over 2000 lb 28.75.

Copper Cyanide: Under 1000 lb 63.90, 1000 lb and over 61.90.

Copper Sulphate: 100-6000 lb 11.35; 6000-12,000 lb 11.10; 12,000-24,000 lb 10.85; 24,000-36,000 lb 10.60; 36,000 lb and over 10.35.

Nickel Chloride: 100 lb 45.00; 200 lb 43.00; 300 lb 42.00; 400-4900 lb 40.00; 5000-9900 lb 38.00; 10,000 lb and over 37.00.

Nickel Sulphate: 100 lb 37.00; 200 lb 35.00; 300 lb 34.00; 400-4900 lb 32.00; 5000-35,000 lb 30.00; 36,000 lb and over 29.00.

Silver Cyanide: Cent; per ounce, 16 oz 80.625; 100 oz 78.50; 2500 oz and over 77.375.

Sodium Cyanide: Egg, under 1000 lb 19.80, 1000-19,900 lb 18.80, 20,000 lb and over 17.80; granular, add 1.0 premium to above.

Sodium Stannate: Less than 100 lb 67.7; 100-600 lb 53.7; 700-1000 lb 51.1; 2000-9900 lb 49.4; 10,000 lb or more 48.3.

Stannous Chloride (Anhydrous): Less than 50 lb $1.527; 50 lb $1.87; 100-300 lb $1.037; 400-900 lb $1.013; 1000-1900 lb 98.8; 2000-4900 lb 95.2; 5000-19,000 lb 89.1; 20,000 lb and over 83.

Stannous Sulphate: Less than 50 lb $1.229; 50 lb 92.9; 100-1900 lb 90.9; 2000 lb and over 88.9.

Zinc Cyanide: Under 1000 lb 54.30, 1000 lb and over 52.30.

Nonferrous Metals

At this Christmas season there's no spirit in buying nonferrous metals. Users are confining purchases to the bare amounts needed to keep production going

THE NEW YEAR is still months away if buyers' activities are any criterion.

They seem to be thinking only about January supplies of nonferrous metals. Aside from the normal preholiday inertia and year end paring of inventory for tax purposes, there's a notable reluctance on the part of fabricators to extend their commitments any more than necessary to maintain production. With the exception of nickel, some forms of aluminum and a few other products, that means less than a month.

Copper Quandary—Sales of copper for January are extremely light to date, principally because of Chile's re-entry into world markets as a seller for the first time in five months. Sales have been made at a reported 30 cents a pound, today's going price, with largest shipments destined for subsidiaries of Anaconda and Kennecott, the two U. S. companies with mines in Chile.

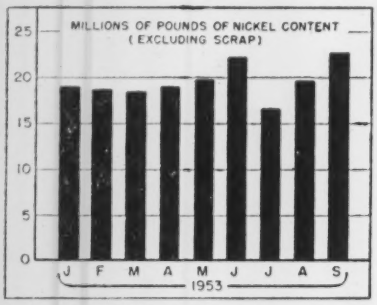
Both electrolytic and fire refined copper are being sold, and on a delivered price basis. These sales require prior approval by the central bank of Chile. Official approval of a U. S.-Chilean purchase pact for copper is seen as some time off by copper men as a formal bill must be introduced in Chile's lower congressional chamber, approved by the upper chamber and signed into law by the president.

Long Road Down—Other points of erosion that will undermine copper's price are seen in lower scrap buying by custom smelters and ingot makers, slight decline in inquiries by scrap exporters and slipping copper quotation on the London metal exchange.

Another sign of sharper competition is the decision of Phelps Dodge Corp. to sell refined copper on a uniform delivered price basis throughout the U. S. beginning in January. The action, which eliminates a premium in midwest and western consuming points, follows a course set in mid-1950 by Kennecott Copper Corp. Other producers likely will follow.

Wait and See—Aluminum fabricators' operations are generally steady, but their ordering is not. Because P.A.'s are convinced that supply is no longer acute, they're content to put off buying longer. Another theory: Fabricators got delivery of a lot of mill products they didn't expect during shortage times and now must get rid of inventories they wouldn't admit they had.

NICKEL SUPPLY IMPROVES
(Imports into U. S.)



Source: U. S. Bureau of Mines.

Production in the early part of next year will be based on how well sales of finished goods are going today. Suppliers believe the first quarter will shape up well after a slow January. Today, mill delivery time of five or six weeks is normal for sheet, wire, rod, bar, extrusions and tubing. That can be cut to four weeks in emergency cases. Warehouse stocks are well rounded, but sales are lagging.

Hand-to-Mouth—Lead and zinc users still buy only for immediate needs and on an average price basis. Lead is in a more vulnerable position with London price falling off. It's now at the point where Mexican lead might be more profitably shipped to the U. S. than to Europe, where it has been going in recent months.

Renewed production of batteries in January for new autos and for replacements should bolster sales. Zinc markets are especially listless.

Historically, zinc has commanded a premium of about 1 cent over lead. Today at 10 cents, zinc is 3.5 cents below lead. Speculation on eventual return to the normal relationship centers on whether zinc will go up or lead down. Majority opinion is that it will be a combination of the two.

Tin Will Resist Controls

Agreement reached at the Geneva tin conference heartened traders sufficiently to bolster prices, but a workable plan to control production and set maximum and minimum prices is seen as having little chance for success. One reason is the 40,000 tons of tin stocked by the U. S. government that may be sold to industrial users next year.

The draft agreement would commence during the second quarter of 1954 if a certain number of producing and consuming countries ratify it. The plan can become effective without U. S. ratification, which is considered unlikely. It calls for a floor-and-ceiling price range equivalent to 80 cents to $1.10 and a buffer stock of up to 25,000 tons of tin metal. Effective range would be 90 cents to $1.00 because of a provision for buying for this reserve if price goes under 90 cents and for selling if it goes over $1.00.

Downhill for Copper

November shipments of refined copper to U. S. fabricators (100,908 tons) sank to the lowest level since June, 1952. Foreign fabricators went in the other direction though: Deliveries of 80,009 tons were a jump of about 10,000 tons from October and highest since January.

Reflecting the Chilean impasse, stocks of refined copper abroad climbed to 26,096 tons entering December, highest since depression days. U. S. producers stocks reached a post-Korea high of 93,274 tons, up 9000 tons in the month. Domestic refined output was 119,230 tons, off 6000 tons from October because of a sharp slump in secondary production.

Nonferrous Briefs

- Buying prices on copper and aluminum scrap are off up to 1 cent in major markets with most pronounced slump in the midwest.

- A trade agreement recently concluded between Indonesia and Communist China calls for delivery of sizable quantities of tin and rubber behind the bamboo curtain over the next year.

- Further cutbacks of operation at zinc smelting plants are rumored as overproduction and sky-high stocks continue to haunt the industry.

- Reported government purchases of mercury for stockpile have bolstered the market. Even Mexican mercury, which is of lower quality than Spanish and Italian, is sold well into the first of the year.

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STEEL PRICES

Mill prices as reported to STEEL, cents per pound except as otherwise noted. Changes shown in italics.
Code numbers following mill points indicate producing company, key on page 127. Key to footnotes, page 129.

—SEMIFINISHED—

INGOTS, Carbon Forging (NT)
Fontana,Calif. K1 ....$86.00
Munhall,Pa. U5 ....59.00

INGOTS, Alloy (NT)
Detroit R7 ....$63.00
Fontana,Calif. K1 ....88.00
Midland,Pa. C18 ....62.00
Munhall,Pa. U5 ....62.00

BILLETS, BLOOMS & SLABS Carbon Rerolling (NT)
Aliquippa,Pa. J5 ....$62.00
Bessemer,Pa. U5 ....62.00
Clairton,Pa. U5 ....62.00
Ensley,Ala. T2 ....62.00
Fairfield,Ala. T2 ....62.00
Fontana,Calif. K1 ....70.00
Gary,Ind. U5 ....62.00
Johnstown,Pa. B2 ....62.00
Lackawanna,N.Y. B2 ..62.00
Munhall,Pa. U5 ....62.00
So.Chicago,Ill. U5 ....62.00
So.Duquesne,Pa. U5 ....62.00

Carbon, Forging (NT)
Aliquippa,Pa. J5 ....$75.50
Bessemer,Pa. U5 ....75.50
Buffalo R2 ....75.50
Canton,O. R2 ....75.50
Clairton,Pa. U5 ....75.50
Cleveland R2 ....75.50
Conshohocken,Pa. A3 ..82.50
Detroit R7 ....78.50
Ensley,Ala. T2 ....75.50
Fairfield,Ala. T2 ....75.50
Fontana,Calif. K1 ....82.50
Gary,Ind. U5 ....75.50
Geneva,Utah C11 ....75.50
Houston S5 ....83.50
Johnstown,Pa. B2 ....75.50
Lackawanna,N.Y. B2 ..75.50
LosAngeles B3 ....94.50
Munhall,Pa. U5 ....75.50
Seattle B3 ....94.50
So.Chicago R2,U5,W14 75.50
So.Duquesne,Pa. U5 ..75.50
So.SanFrancisco B3 ..94.50

Alloy, Forging (NT)
Bethlehem,Pa. B2 ....$82.00
Buffalo R2 ....82.00
Canton,O. R2, T7 ....82.00
Conshohocken,Pa. A3 ..89.00
Detroit R7 ....84.00
Fontana,Calif. K1 ....101.00
Gary,Ind. U5 ....82.00
Houston S5 ....90.00
Ind Harbor,Ind. Y1 ..82.00
Johnstown,Pa. B2 ....82.00
Lackawanna,N.Y. B2 ..82.00
LosAngeles B3 ....102.00
Massillon,O. R2 ....82.00
Midland,Pa. C18 ....82.00
Munhall,Pa. U5 ....82.00
So.Chicago R2,U5,W14 82.00
So.Duquesne,Pa. U5 ..82.00
Struthers,O. Y1 ....82.00
Warren,O. C17 ....82.00

ROUNDS, SEAMLESS TUBE (NT)
Buffalo R2 ....$92.50
Canton,O. R2 ....92.50
Cleveland R2 ....92.50
Fontana,Calif. K1 ....113.50
Gary,Ind. U5 ....92.50
Massillon,O. R2 ....92.50
So.Chicago,Ill. R2 ....92.50
So.Duquesne,Pa. U5 ..92.50

SHEET BAR (NT)
Fontana,Calif. K1 ....$93.18

SKELP
Aliquippa,Pa. J5 ....3.85
Munhall,Pa. U5 ....3.75
Warren,O. R2 ....3.75
Youngstown R2, U5 ....3.75

WIRE RODS
Alabama City,Ala. R2 ..4.525
Aliquippa,Pa. J5 ....4.525
Alton,Ill. L1 ....4.70
Buffalo W12 ....4.525
Cleveland A7 ....4.525
Donora,Pa. A7 ....4.525
Fairfield,Ala. T2 ....4.525
Fontana,Calif. K1 ....5.325
Houston S5 ....4.925
Johnstown,Pa. B2 ....4.525
Joliet,Ill. A7 ....4.525
Kansas City,Mo. S5 ....4.865
LosAngeles B3 ....5.325
Minnequa,Colo. C10 ....4.775
Monessen,Pa. P7 ....4.725
No.Tonawanda,N.Y. B11 4.525
Pittsburg,Calif. C11 ....5.175
Portsmouth P12 ....4.525
Roebling,N.J. R5 ....4.625
So.Chicago,Ill. R2 ....4.525
SparrowsPoint,Md. B2 ..4.625
Sterling,Ill.(1) N15 ....4.525
Struthers,O. Y1 ....4.525
Torrance,Calif. C11 ....5.325
Worcester,Mass. A7 ....4.825

—STRUCTURALS—

Carbon Steel Stand. Shapes
Alabama City,Ala. R2 ..4.10
Aliquippa,Pa. J5 ....4.10
Bessemer,Ala. T2 ....4.10
Bethlehem,Pa. B2 ....4.15
Clairton,Pa. U5 ....4.10
Fairfield,Ala. T2 ....4.10
Fontana,Calif. K1 ....4.75
Gary,Ind. U5 ....4.10
Geneva,Utah C11 ....4.10
Houston S5 ....4.50
Ind Harbor,Ind. I-2 ....4.10
Johnstown,Pa. B2 ....4.15
KansasCity,Mo. S5 ....4.80
Lackawanna,N.Y. B2 ..4.15
LosAngeles B3 ....4.80
Minnequa,Colo. C10 ....4.55
Munhall,Pa. U5 ....4.10
Niles,Calif.(22) P1 ....4.90
Phoenixville,Pa. P4 ....4.15
Seattle B3 ....4.50
So.Chicago,Ill. U5, W14 4.10
So.SanFrancisco B3 ....4.75
Torrance,Calif. C11 ....4.80
Weirton,W.Va. W6 ....4.35

Wide Flange
Bethlehem,Pa. B2 ....4.15
Clairton,Pa. U5 ....4.10
Fontana,Calif. K1 ....5.30
Lackawanna,N.Y. B2 ..4.15
Munhall,Pa. U5 ....4.10
Phoenixville,Pa. P4 ....4.95
So.Chicago,Ill. U5 ....4.10

Alloy Stand. Shapes
Clairton,Pa. U5 ....5.00
Fontana,Calif. K1 ....6.40
Gary,Ind. U5 ....5.00
Munhall,Pa. U5 ....5.00
So.Chicago,Ill. U5 ....5.00

H.S., L.A. Stand. Shapes
Aliquippa,Pa. J5 ....6.175
Bessemer,Ala. T2 ....6.175
Bethlehem,Pa. B2 ....6.20
Clairton,Pa. U5 ....6.175
Fairfield,Ala. T2 ....6.175
Fontana,Calif. K1 ....6.825
Gary,Ind. U5 ....6.175
Geneva,Utah C11 ....6.175
Ind Harbor,Ind. I-2 ....6.175
Ind Harbor,Ind. Y1 ....6.675
Johnstown,Pa. B2 ....6.20
Lackawanna,N.Y. B2 ..6.20
LosAngeles B3 ....6.85
Munhall,Pa. U5 ....6.175
Seattle B3 ....6.90
So.Chicago,Ill. U5, W14 6.175
So.SanFrancisco B3 ....6.80
Struthers,O. Y1 ....6.675

H.S., L.A. Wide Flange
Bethlehem,Pa. B2 ....6.20
Lackawanna,N.Y. B2 ..6.20
Munhall,Pa. U5 ....6.125
So.Chicago,Ill. U5 ....6.125

BEARING PILES
Munhall,Pa. U5 ....4.10
So.Chicago,Ill. U5 ....4.10

—PILING—

STEEL SHEET PILING
Ind Harbor,Ind. I-2 ....4.925
Lackawanna,N.Y. B2 ..4.925
Munhall,Pa. U5 ....4.925
So.Chicago,Ill. U5 ....4.925

—PLATES—

PLATES, Carbon Steel
Alabama City,Ala. R2 ..4.10
Aliquippa,Pa. J5 ....4.10
Ashland,Ky. (15) A10 ..4.10
Bessemer,Ala. T2 ....4.10
Clairton,Pa. U5 ....4.10
Claymont,Del. C22 ....4.20
Cleveland J5 R2 ....4.10
Coatesville,Pa. L7 ....4.20
Conshohocken,Pa. A3 ..4.25
Ecorse,Mich. G5 ....4.30
Fairfield,Ala. T2 ....4.10
Fontana,Calif.(30) K1 ..4.75
Gary,Ind. U5 ....4.10
Geneva,Utah C11 ....4.10
GraniteCity,Ill. G4 ....4.30
Harrisburg,Pa. C5 ....4.10
Houston S5 ....4.50
Ind Harbor,Ind. I-2, Y1 4.10
Johnstown,Pa. B2 ....4.10
Lackawanna,N.Y. B2 ..4.10
Minnequa,Colo. C10 ....4.95
Munhall,Pa. U5 ....4.10
Pittsburgh J5 ....4.10
Riverdale,Ill. A1 ....4.10
Seattle B3 ....5.00
Sharon,Pa. S3 ....4.10
So.Chicago,Ill. U5, W14 4.10
SparrowsPoint,Md. B2 ..4.10
Steubenville,O. W10 ....4.10
Warren,O. R2 ....4.10
Weirton,W.Va. W6 ....4.10
Youngstown R2, U5, Y1 4.10

PLATES, Carbon Abras. Resist.
Fontana,Calif. K1 ....5.90
Geneva,Utah C11 ....5.25

PLATES, Wrought Iron
Economy,Pa. B14 ....9.30

PLATES, High-Strength Low-Alloy
Aliquippa,Pa. J5 ....6.25
Bessemer,Ala. T2 ....6.25
Clairton,Pa. U5 ....6.25
Cleveland J5 ....6.25
Conshohocken,Pa. A3 ..6.25
Ecorse,Mich. G5 ....6.45
Fairfield,Ala. T2 ....6.25
Fontana,Calif.(30) K1 ..6.95
Gary,Ind. U5 ....6.25
Geneva,Utah C11 ....6.25
Ind Harbor,Ind. I-2 ....6.25
Ind Harbor,Ind. Y1 ....6.75
Johnstown,Pa. B2 ....6.25
Lackawanna,N.Y. B2 ..6.25
Munhall,Pa. U5 ....6.25
Pittsburgh J5 ....6.25
Seattle B3 ....7.15
Sharon,Pa. S3 ....6.25
So.Chicago,Ill. U5, W14 6.25
SparrowsPoint,Md. B2 ..6.25
Youngstown U5 ....6.25
Youngstown Y1 ....6.75

PLATES, Alloy
Claymont,Del. C22 ....5.55
Coatesville,Pa. L7 ....5.55
Fontana,Calif. K1 ....6.60
Gary,Ind. U5 ....5.55
Johnstown,Pa. B2 ....5.55
Munhall,Pa. U5 ....5.55
Sharon,Pa. S3 ....5.55
So.Chicago,Ill. U5, W14 5.55
SparrowsPoint,Md. B2 ..5.55

FLOOR PLATES
Cleveland J5 ....5.15
Conshohocken,Pa. A3 ..5.15
Harrisburg,Pa. C5 ....5.15
Ind Harbor,Ind. I-2 ....5.15
Munhall,Pa. U5 ....5.15
So.Chicago,Ill. U5 ....5.15

PLATES, Ingot Iron
Ashland,c.l. (15) A10 ..4.35
Ashland,l.c.l.(15) A10 ..4.85
Cleveland, c.l. R2 ....4.70
Warren,O. c.l. R2 ....4.70

—BARS—

BARS, Hot-Rolled Carbon
Aliquippa,Pa. J5 ....4.15
Alton,Ill. L1 ....4.35
Atlanta,Ga. A11 ....4.40
Bessemer,Ala. T2 ....4.15
Buffalo(3) R2 ....4.18
Clairton,Pa. U5 ....4.15
Cleveland(3) R2 ....4.21
Detroit R7 ....4.30
Ecorse,Mich. G5 ....4.35
Emeryville,Calif. J7 ....4.90
Fairfield,Ala. T2 ....4.15
Fairless,Pa. U5 ....4.30
Fontana,Calif. K1 ....4.85
Gary,Ind. U5 ....4.15
Gadsden,Ala.(3) R2 ....4.18
Houston S5 ....4.55
Ind Harbor,Ind. I-2, Y1 4.15
Johnstown,Pa. B2 ....4.15
KansasCity,Mo. S5 ....4.85
Lackawanna,N.Y. B2 ..4.15
LosAngeles B3 ....4.85
Milton,Pa. M18 ....4.15
Minnequa,Colo. C10 ....4.60
Niles,Calif. P1 ....4.85
N.Tonawanda,N.Y. B11 4.15
Pittsburg,Calif. C11 ....4.85
Pittsburgh J5 ....4.15
Portland,Oreg. O4 ....4.90
Seattle B3, N14 ....4.90
So.Chicago U5, W14 ....4.15
Chicago(3) R2 ....4.22
So.Duquesne,Pa. U5 ....4.15
So.SanFran.,Calif. B3 ..4.90
Sterling,Ill.(1) N15 ....4.15
Struthers,O. Y1 ....4.15
Torrance,Calif. C11 ....4.85
Weirton,W.Va. W6 ....4.15
Youngstown U5 ....4.15
Youngstown(3) R2 ....4.20

BARS, Hot-Rolled Alloy
Bethlehem,Pa. B2 ....4.875
Buffalo R2 ....4.875
Canton,O. R2, T7 ....4.875
Clairton,Pa. U5 ....4.875
Detroit R7 ....4.975
Ecorse,Mich. G5 ....5.075
Fairless,Pa. U5 ....5.025
Fontana,Calif. K1 ....5.925
Gary,Ind. U5 ....4.875
Houston S5 ....5.275
Ind Harbor,Ind. I-2, Y1 4.875
Johnstown,Pa. B2 ....4.875
KansasCity,Mo. S5 ....5.575
Lackawanna,N.Y. B2 ..4.875
LosAngeles B3 ....5.925
Massillon,O. R2 ....4.875
Midland,Pa. C18 ....4.875
So.Chicago R2, U5,W14 4.875
So.Duquesne,Pa. U5 ..4.875
Struthers,O. Y1 ....4.875
Warren,O. C17 ....4.875
Youngstown U5 ....4.875

BARS & SMALL SHAPES, H.R. High-Strength Low-Alloy
Aliquippa,Pa. J5 ....6.225
Bessemer,Ala. T2 ....6.225
Bethlehem,Pa. B2 ....6.225
Clairton,Pa. U5 ....6.225
Ecorse,Mich. G5 ....6.425
Fairfield,Ala. T2 ....6.225
Fontana,Calif. K1 ....7.475
Gary,Ind. U5 ....6.225
Ind Harb.,Ind. Y1 ....6.725
Ind Harb.,Ind. I-2 ....6.225
Johnstown,Pa. B2 ....6.225
Lackawanna,N.Y. B2 ..6.225
LosAngeles B3 ....6.925
Pittsburgh J5 ....6.225
Seattle B3 ....6.975
So.Chicago W14 ....6.225
So.Duquesne,Pa. U5 ..6.225
So.SanFrancisco B3 ..6.975
Struthers,O. Y1 ....6.725
Youngstown U5 ....6.225

BAR SIZE ANGLES; H.R.CARBON
Bethlehem,Pa. B2 ....4.35

BAR SIZE ANGLES; S. Shapes
Aliquippa,Pa. J5 ....4.15
Atlanta A11 ....4.40
Niles,Calif. P1 ....4.85
SanFrancisco S7 ....5.10

BAR SHAPES, Hot-Rolled Alloy
Clairton,Pa. U5 ....5.00
Fontana,Calif. K1 ....6.00
Gary,Ind. U5 ....5.00
Houston S5 ....5.60
KansasCity S5 ....5.90
Youngstown U5 ....5.00

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 ....5.20
BeaverFalls,Pa. M12, R2 5.20
Buffalo B5 ....5.25
Camden,N.J. P13 ....5.65
Carnegie,Pa. C12 ....5.20
Chicago W18 ....5.20
Cleveland A7, C20 ....5.20
Detroit P17, R7 ....5.35
Detroit B5 ....5.40
Donora,Pa. A7 ....5.20
Elyria,O. W8 ....5.20
FranklinPark,Ill. N5 ..5.20
Gary,Ind. R2 ....5.20
GreenBay,Wis. F7 ....5.20
Hammond,Ind. L2, M13 5.20
Hartford,Conn. R2 ....5.75
Harvey,Ill. B5 ....5.20
LosAngeles R2 ....6.65
Mansfield,Mass. B5 ....5.75
Massillon,O. R2, R8 ..5.20
Monaca,Pa. S17 ....5.20
Newark,N.J. W18 ....5.65
NewCastle,Pa. (17) B4 5.20
Pittsburgh J5 ....5.20
Plymouth,Mich. P5 ....5.45
Putnam,Conn. W18 ....5.75
Readville,Mass. C14 ....5.75
St.Louis,Mo. M5 ....5.60
So.Chicago,Ill. W14 ....5.20
SpringCity,Pa. K3 ....5.65
Struthers,O. Y1 ....5.20
Waukegan,Ill. A7 ....5.20
Worcester,Mass. W19 ....6.10
Youngstown F3, Y1 ....5.20

BARS, Cold-Finished Carbon (Turned and Ground)
Cumberland,Md. (5) C19 4.45

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 ....6.325
BeaverFalls,Pa. M12 ..6.325
Bethlehem,Pa. B2 ....6.325
Buffalo B5 ....6.325
Camden,N.J. P13 ....6.50
Canton,O. R2, T7 ....6.325
Carnegie,Pa. C12 ....6.325
Chicago W18 ....6.325
Cleveland A7, C20 ....6.325
Detroit R7 ....6.425
Detroit P17 ....6.475
Detroit B5 ....6.525
Donora,Pa. A7 ....6.325
Elyria,O. W8 ....6.325
Gary,Ind. R2 ....6.325
Hammond,Ind. L2, M13 6.325
Hartford,Conn. R2 ....6.775
Harvey,Ill. B5 ....6.325
Lackawanna,N.Y. B2 ..6.325
Mansfield,Mass. B5 ..6.775
Massillon,O. R2, R8 ..6.325
Midland,Pa. C18 ....6.325
Monaca,Pa. S17 ....6.325
Newark,N.J. W18 ....6.65
Plymouth,Mich. P5 ....6.525
So.Chicago,Ill. R2, W14 6.325
SpringCity,Pa. K3 ....6.50
Struthers,O. Y1 ....6.325
Warren,O. C17 ....6.325
Waukegan,Ill. A7 ....6.325
Worcester,Mass. A7 ..6.625
Youngstown F3, Y1 ..6.325

BARS, Reinforcing (Fabricators)
Alabama City,Ala. R2 ..4.15
Atlanta A11 ....4.40
Buffalo R2 ....4.15
Cleveland R2 ....4.15
Emeryville,Calif. J7 ....4.90
Fairfield,Ala. T2 ....4.15
Fairless,Pa. U5 ....4.30
Fontana,Calif. K1 ....4.85
Gary,Ind. U5 ....4.15
Houston S5 ....4.55
Ind Harbor,Ind. I-2, Y1 4.15
Johnstown,Pa. B2 ....4.15
KansasCity,Mo. S5 ....4.85
Lackawanna,N.Y. B2 ..4.15
LosAngeles B3 ....4.85
Milton,Pa. M18 ....4.15
Minnequa,Colo. C10 ....4.75
Niles,Calif. P1 ....4.85
Pittsburg,Calif. C11 ....4.85
Pittsburgh J5 ....4.15
SandSprings,Okla. S5 ..5.00
Seattle B3, N14 ....4.90
So.Chicago,Ill. R2 ....4.15
So.Duquesne,Pa. U5 ....4.15
So.SanFrancisco B3 ....4.90
SparrowsPoint,Md. B2..4.15
Sterling,Ill. (1) N15 ..4.15
Struthers,O. Y1 ....4.15
Torrance,Calif. C11 ....4.85
Youngstown R2, U5 ....4.15

BARS, Reinforcing (Fabricated; to consumers)
Johnstown, ¾-1" B2 ....5.55
KansasCity S5 ....6.35
LosAngeles B3 ....5.80
Marion,O. P11 ....5.55
Seattle N14 ....5.80
Seattle B3 ....5.85
So.SanFrancisco B3 ....5.85
SparrowsPt. ¾-1" B2 ..5.55
Williamsport,Pa. S19 ..5.45

RAIL STEEL BARS
Avis,Pa.(4) J8 ....4.25
ChicagoHts.(3) C2 ....4.50
ChicagoHts.(4) C2 ....4.75
ChicagoHts.(3,4) 1-2 ..4.50
FortWorth,Tex.(26) T4 4.65
Franklin,Pa.(3) F5 ....4.50
Franklin,Pa.(4) F5 ....4.75
Marion,O.(3) P11 ....4.50
Moline,Ill.(3) R2 ....4.25
Tonawanda(3,4) B12 ..5.00
Williamsport,Pa.(3) S19 4.50
Williamsport,Pa.(4) S19 5.45

BARS, Wrought Iron
Economy,Pa.(S.R.) B14 10.40
Economy,Pa.(D.R.)B14 12.90
Economy(Staybolt) B14 13.20
Mc.K.Rks.(S.R.) L5 ..10.40
Mc.K.Rks.(D.R.) L5 ..14.00
Mc.K.Rks.(Staybolt) L5 15.50

—SHEETS—

SHEETS, Hot-Rolled Steel (18 gage and heavier)
Alabama City,Ala. R2 ..3.925
Allenport,Pa. P7 ....3.925
Ashland,Ky.(8) A10 ..3.925
Butler,Pa. A10 ....3.925
Cleveland J5 R2 ....3.925
Conshohocken,Pa. A3 ..4.05
Detroit M1 ....4.15
Ecorse,Mich. G5 ....4.125
Fairfield,Ala. T2 ....3.925
Fairless,Pa. U5 ....4.025
Fontana,Calif. K1 ....4.70
Gary,Ind. U5 ....3.925
Geneva,Utah C11 ....4.025
GraniteCity,Ill. G4 ....4.125
Ind Harbor,Ind. I-2, Y1 3.925
Irvin,Pa. U5 ....3.925
Kokomo,Ind. C16 ....4.025
Lackawanna,N.Y. B2 ..3.925

Munhall,Pa. U5 .....3.925
Newport,Ky. N9 .....3.925
Niles,O. N12 .....*5.175*
Pittsburgh,Calif. C11 ..4.625
Pittsburgh J5 .....3.925
Portsmouth,O. P12 .....3.925
Riverdale,Ill. A1 .....3.925
Sharon,Pa. S3 .....3.925
So.Chicago,Ill. W14 ..3.925
SparrowsPoint,Md. B2..3.925
Steubenville,O. W10 ..3.925
Torrance,Calif. C11 ...4.625
Warren,O. R2 .....3.925
Weirton,W.Va. W6 ...3.925
Youngstown U5, Y1 ..3.925

SHEETS, H.R. (19 gage)

AlabamaCity, Ala. R2..5.225
Dover,O. R1 .....5.05
Kokomo,Ind. C16 ....5.025
Mansfield,O. E6 .....5.05
Niles,O. N12 .....*4.775*
Torrance,Calif. C11 ...5.875

SHEETS, H.R. (14 ga. heavier) High-Strength Low-Alloy

Cleveland J5, R2 .....5.90
Conshohocken,Pa. A3 ..5.90
Ecorse,Mich. G5 .....6.10
Fairfield,Ala. T2 .....5.90
Fontana,Calif. K1 ....6.675
Gary,Ind. U5 .....5.90
Ind.Harbor,Ind. I-2 ....5.90
Ind.Harbor,Ind. Y1 ....6.40
Irvin,Pa. U5 .....5.90
Lackawanna(35) B2 ....5.90
Munhall,Pa. U5 .....5.90
Pittsburgh J5 .....5.90
Sharon,Pa. S3 .....5.90
So.Chicago,Ill. U5 ....5.90
SparrowsPoint(36) B2..5.90
Warren,O. R2 .....5.90
Weirton,W.Va. W6 ....5.90
Youngstown U5 .....5.90
Youngstown Y1 .....6.40

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10 ..4.175
Cleveland R2 .....4.525
Ind.Harbor,Ind. I-2 ..4.175
Warren,O. R2 .....4.525

SHEETS, Cold-Rolled Steel (Commercial Quality)

Allenport,Pa. P7 .....4.775
Butler,Pa. A10 .....4.775
Cleveland J5, R2 .....4.775
Ecorse,Mich. G5 .....4.975
Fairfield,Ala. T2 .....4.775
Fairless,Pa. U5 .....4.875
Follansbee,W.Va. F4 ..5.775
Fontana,Calif. K1 ....5.875
Gary,Ind. U5 .....4.775
GraniteCity,Ill. G4 ...4.975
Ind.Harbor,Ind. I-2,Y1 4.775
Irvin,Pa. U5 .....4.775
Lackawanna,N.Y. B2 ..4.775
Middletown,O. A10 ....4.775
Pittsburg,Calif. C11 ..5.725
Pittsburgh J5 .....4.775
Portsmouth,O. P12 .....4.775
SparrowsPoint,Md. B2 4.775
Steubenville,O. W10 ...4.775
Warren,O. R2 .....4.775
Weirton,W.Va. W6 ....4.775
Youngstown Y1 .....4.775

SHEETS, Cold-Rolled High-Strength Low-Alloy

Cleveland J5, R2 .....7.225
Ecorse,Mich. G5 .....7.425
Fontana,Calif. K1 ....8.275
Gary,Ind. U5 .....7.225
IndianaHarbor,Ind. Y1 7.725
Irvin,Pa. U5 .....7.225
Lackawanna(37) B2 ....7.225
Pittsburgh J5 .....7.225
SparrowsPoint (38) B2 7.225
Warren,O. R2 .....7.225
Weirton,W.Va. W6 ....7.225
Youngstown Y1 .....7.725

SHEETS, Cold-Rolled Ingot Iron

Butler,Pa. A10 .....5.275
Cleveland R2 .....5.375
Middletown,O. A10 ....5.275
Warren,O. R2 .....5.375

SHEETS, Gal'd No. 10 Steel

AlabamaCity,Ala. R2..5.275
Ashland,Ky.(8) A10 ..5.275
Canton,O. R2 .....5.275
Delphos,O. N16 .....5.775
Dover,O. R1 .....5.275
Fairfield,Ala. T2 ....5.275†
Gary,Ind. U5 .....5.275†
GraniteCity,Ill. G4 ....5.475
Ind.Harbor,Ind. I-2 ....5.325
Irvin,Pa. U5 .....5.275†
Kokomo,Ind.(13) C16..5.375
MartinsFerry,O. W10 ..5.275
Niles,O. N12 .....*5.275*
Pittsburg,Calif. C11 ...6.025†
SparrowsPoint,Md. B2 5.275
Steubenville,O. W10 ..5.275
Torrance,Calif. C11 ..6.275†
Weirton,W.Va. W6 ....5.275

†Based on 5c zinc.

SHEETS, Galvanized No. 10 High-Strength Low-Alloy

Irvin,Pa. U5 .....7.925
SparrowsPoint(39) B2 .8.075

SHEETS, Galvanized Ingot Iron No. 10 flat

Ashland,Ky.(8) A10 ..5.525
Canton,O. R2 .....6.025

SHEETS, Culvert	Cu Alloy	Cu Fe
Ashland,Ky. A10	6.325	....
Canton,O. R2	....6.475	6.325
Fairfield T2	....6.075	6.325
Gary,Ind. U5	...6.075	6.325
Ind.Harbor I-2	..6.075	6.325
Irvin,Pa. U5	...6.075	6.325
Kokomo,Ind. C16	*6.175*	....
MartinsFry.,O.W10	6.075	...
Pitts.,Cal. C11	..6.825	....
SparrowsPt. B2	6.075	....
Torrance,Cal. C11	7.075	....

SHEETS, Culvert Pure Iron

Ashland,Ky. A10 .....6.575
Fairfield, Ala. T2 .....6.325
MartinsFerry,O. W10 ..6.325

SHEETS, Galvannealed Steel

Canton,O. R2 .....5.825
Irvin,Pa. U5 .....5.825†
Kokomo,Ind.(13) C16..5.925
Niles,O. N12 .....*5.825*

†Based on 5c zinc

SHEETS, ZINCGRIP Steel

Butler,Pa. A10 .....5.525
Middletown,O. A10 ....5.525

SHEETS, ZINCGRIP Ingot Iron

Butler,Pa. A10 .....5.775
Middletown,O. A10 ....5.775

SHEETS, Electrogalvanized

Cleveland R2 (28) 6.125
Niles,O. R2 (28) 6.125
Weirton,W.Va. W6 ....5.975

SHEETS, ALUMINIZED

Butler,Pa. A10 .....8.625

SHEETS, Enameling Iron

Ashland,Ky.(8) A10 ..5.175
Cleveland R2 .....5.175
Gary,Ind. U5 .....5.175
GraniteCity,Ill. G4 ...5.875
Ind.Harbor,Ind. I-2 ....5.175
Irvin,Pa. U5 .....5.175
Middletown,O. A10 ....5.175
Niles,O. N12 .....*6.525*
Youngstown Y1 .....5.175

BLUED STOCK, 29 ga.

Yorkville,O. W10 .....7.20
Follansbee,W.Va. F4 ..7.30
Follansbee (23) F4 ...7.175

SHEETS, Long Terne Steel (Commercial Quality)

BeechBott'm,W.Va.W10 5.675
Gary,Ind. U5 .....5.675
Mansfield,O. E6 .....5.675
Middletown,O. A10 ....5.675
Niles,O. N12 .....*5.675*
Weirton,W.Va. W6 ....5.675

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 .... 6.075

SHEETS, Well Casing

Fontana,Calif. K1 ....6.20

—STRIP—

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2 ...3.925
Allenport,Pa. P7 .....3.925
Alton,Ill. L1 .....4.10
Ashland,Ky.(8) A10 ..3.925
Atlanta A11 .....4.175
Bessemer,Ala. T2 .....3.925
Bridgeport,Conn.(10)S15 4.15
Buffalo (27) R2 .....3.925
Butler,Pa. (8) A10 ...3.925
Carnegie,Pa. S18 .....4.425
Conshohocken,Pa. A3 ..4.05
Detroit M1 .....4.15
Ecorse,Mich. G5 .....4.125
Fairfield,Ala. T2 .....3.925
Fontana,Calif. K1 ....4.70
Gary,Ind. U5 .....3.925
Houston,Tex. S5 .....4.325
Ind.Harbor,Ind. I-2,Y1 3.925
Johnstown,Pa.(25) B2 3.925
KansasCity,Mo.(9) S5 4.625
Lackawna,N.Y.(25) B2 3.925
LosAngeles(25) B3 ....4.675
Milton,Pa. M18 .....3.925
Minnequa,Colo. C10 ...5.025
NewBritain(10) S15 .....4.15
N.Tonawanda,N.Y.B11 3.925
Pittsburg,Calif. C11 ...4.675
Portsmouth,O. P12 .....3.925
Riverdale,Ill. A1 .....3.925
SanFrancisco S7 .....5.10
Seattle(25) B3 .....4.925
Seattle N14 .....4.925
Sharon,Pa. S3 .....3.925
So.Chicago,Ill. W14 ...3.925
So.SanFrancisco(25)B3 4.675
SparrowsPoint,Md. B2 3.925
Torrance,Calif. C11 ...4.675
Warren,O. R2 .....3.925
Weirton,W.Va. W6 ....3.925
Youngstown U5 .....3.925

STRIP, Hot-Rolled Alloy

Bridgeport,Conn.(10)S15 6.45
Carnegie,Pa. S18 .....6.40
Fontana,Calif. K1 .....7.80
Gary,Ind. U5 .....6.40
Houston,Tex. S5 .....6.80
KansasCity,Mo. S5 ....7.10
LosAngeles B3 .....7.60
NewBritn.,Conn.(10)S15 6.45
Sharon,Pa. S3 .....6.40
So.Chicago W14 .....6.40
Youngstown U5 .....6.40

STRIP, Hot-Rolled High-Strength Low-Alloy

Bessemer,Ala. T2 .....5.95
Conshohocken,Pa. A3 ..5.90
Ecorse,Mich. G5 .....6.15
Fairfield,Ala. T2 .....5.95
Fontana,Calif. K1 ....7.05
Gary,Ind. U5 .....5.95
Ind.Harbor,Ind. I-2 ....5.95
Ind.Harbor,Ind. Y1 ....6.45
Lackawanna,N.Y. B2 ...6.00
LosAngeles(25) B3 ....6.70
Seattle(25) B3 .....6.95
Sharon,Pa. S3 .....5.95
So.SanFrancisco(25) B3 6.70
SparrowsPoint,Md. B2..6.00
Warren,O. R2 .....5.95
Weirton,W.Va. W6 ....5.95
Youngstown Y1 .....6.45
Youngstown U5 .....5.95

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10 ...4.175
Warren,O. R2 .....4.525

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6 .....5.45
Bridgeprt,Conn. (10)S15 5.75
Butler,Pa. A10 .....5.45
Cleveland A7, J5 .....5.45
Dearborn,Mich. D3 ....5.65
Detroit P20 .....5.70
Detroit D2, M1 .....5.65
Dover,O. G6 .....5.45
Ecorse,Mich. G5 .....5.65
Follansbee,W.Va. F4 ...5.45
Fontana,Calif. K1 ....7.35
FranklinPark,Ill. T6 ...5.70
Ind.Harbor,Ind. I-2 ....5.70
Lackawanna,N.Y. B2 ...5.45
LosAngeles C1 .....7.50
Mattapan,Mass. T6 ....6.30
Middletown,O. A10 ....5.45
NewBedford,Mass. R10 *6.00*
NewBritain(10) S15 ....5.75
NewCastle,Pa. B4, E5..5.45
NewHaven,Conn. A7 ....6.20
NewHaven,Conn. D2 ....5.90
Pawtucket,R.I. R3 .....6.80
Pawtucket,R.I. N8 .....6.30
Pittsburgh J5 .....5.45
Riverdale,Ill. A1 .....5.70
Rome,N.Y.(29) R6 .....5.45
Sharon,Pa. S3 .....5.45
SparrowsPoint,Md. B2 ..5.45
Warren,O.(40) T5 .....5.45
Warren,O. R2 .....*5.45*
Warren,O. R2 .....5.45
Weirton,W.Va. W6 ....5.45
Worcester,Mass. W19 ...7.95
Worcester,Mass. A7 ....6.30
Youngstown C8 .....5.95
Youngstown Y1 .....5.45

STRIP, Cold-Rolled Alloy Steel

Bridgeprt,Conn.(10)S15 12.15
Carnegie,Pa. S18 .....12.00
Cleveland A7 .....12.00
Dover,O. G6 .....12.00
Fontana,Calif. K1 ....13.65
Harrison,N.J. C18 ....12.00
NewBritn,Conn.(10)S15 12.15
Pawtucket,R.I.(11) N8 12.15
Pawtucket,R.I.(12) N8 12.45
Sharon,Pa. S3 .....12.00
Worcester,Mass. A7 ...12.30
Youngstown C8 .....12.00

STRIP, Cold-Rolled High-Strength Low-Alloy

Cleveland J5 .....7.80
Cleveland A7 .....8.15
Dearborn,Mich. D3 ....7.90
Dover,O. G6 .....8.00
Ecorse,Mich. G5 .....8.35
Lackawanna,N.Y. B2 ..8.15
Pittsburgh J5 .....7.80
Sharon,Pa. S3 .....7.65
SparrowsPoint,Md. B2 ..8.15
Warren,O. R2 .....7.60
Weirton,W.Va. W6 ....8.15
Youngstown Y1 .....8.30

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2 .....6.05

STRIP, Electrogalvanized

Dover,O. G6 .....5.45
Warren,O. T5 .....5.45
Weirton,W.Va. W6 ....5.45
Youngstown C8 .....*5.70*

TIGHT COOPERAGE HOOP

Atlanta A11 .....4.65
Riverdale,Ill. A1 .....4.50
Sharon,Pa. S3 .....4.35
Youngstown U5 .....4.35

Key to Producers

A1 Acme Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Co.
A7 American Steel & Wire
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A13 American Cladmetal&Co.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Div., Colo. Fuel & Iron
B11 Buffalo Bolt Co. Div., Buffalo-Eclipse Corp.
B12 Buffalo Steel Div. H. K. Porter Co.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C5 Central Iron& Steel Div. Barium Steel Corp.
C7 Cleve. Cold Rolling Mills
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Products Dept. Wickwire Spencer Steel Division
C23 Charter Wire Products
C24 G. O. Carlson Inc.

D2 Detroit Steel Corp.
D3 Detroit Tube & Steel
D4 Disston & Sons, Henry
D6 Driver Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G2 Globe Iron Co.
G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-7 Indiana Steel & Wire Co.
J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M5 Madart Co.
M6 Mercer Tube & Mfg. Co.
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M13 Monarch Steel Co.
M16 Md. Fine & Special Wire
M17 Metal Forming Corp.
M18 Milton Steel Prod. Div., Merritt-Chapman& Scott
N2 National Supply Co.
N3 National Tube Div.
N5 Nelsen Steel & Wire Co.
N6 NewEng.HighCarb.Wire
N8 Newman-Crosby Steel
N9 Newport Steel Corp.
N12 Niles Rolling Mill Div.
N14 Nrthwst Steel Roll. Mills
N15 Northwestern S.&W. Co.
N16 New Delphos Mfg. Co.
O3 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills
P1 Pacific States Steel Corp.
P4 Phoenix Iron & Steel Co.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Division Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.
P20 Prod Steel Strip Corp.

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 Reliance Div., Eaton Mfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanely Works
S16 Struthers Iron & Steel
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
S25 StainlessWeldedProducts
S26 Specialty Wire Co. Inc.

T2 Tenn. Coal & Iron Div.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Strip Division, Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.

U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U. S. Pipe & Foundry

V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Steel Co.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp
W6 Weirton Steel Co.
W7 W.Va. Steel & Mfg. Co.
W8 West-Auto Mach.Screw
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div. International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.
W19 Worcester Pressed Steel
Y1 Youngstown Sheet & Tube

STRIP, Cold-Finished Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Beren,O C7		8.00	8.60	10.55	12.85
Bridgeport,Conn.(10) S15	5.75	7.65	8.60	10.55	12.85
Bristol,Conn W1			8.90	10.85	
Carnegie,Pa S18		7.65	8.60	10.55	12.85
Cleveland A7	5.45	7.65	8.60	10.55	12.85
Dearborn,Mich D3	5.65	7.85	8.80		
Detroit D2	5.65	7.85	8.45	10.55	
Dover,O G6	5.45	7.65	8.60	10.55	12.85
Franklin Park,Ill T6	5.80	7.80	8.75	10.70	
Harrison,N.J C18			8.90	10.85	13.15
Mattapan,Mass T6	6.30	7.95	8.90	10.85	13.15
New Britn,Conn.(10) S15	5.75	7.65	8.60	10.55	12.85
New Castle,Pa B4	5.45	7.65	8.60		
New Castle,Pa E5	5.45	8.00	8.60	10.55	12.85
New Haven,Conn I42	5.90	7.95	8.55	10.65	
New York W3		7.95	8.90	10.85	13.15
Pawtucket,R.I N8					
Cleve or Phila Base		7.65*	8.60	10.55	12.85
Worcester,Mass Base	6.65	7.95	8.90	10.85	13.15
Sharon,Pa S3	5.45	7.65	8.60	10.55	12.85
Trenton,N.J R5		7.95	8.90	10.85	13.15
Wallingford,Conn W2	6.20	7.95	8.90	10.85	13.15
Warren,O T5	5.45	7.65	8.60	10.55	12.85
Weirton,W.Va W6	5.45	7.65	8.60	10.55	12.85
Worcester,Mass A7	6.30	7.95	8.90	10.85	13.15
Worcester,Mass T6	6.30	7.95	8.90	10.85	13.15
Youngstown,O S6		7.65	8.60	10.55	12.85
Spring Steel (Tempered)					
Buffalo W12			12.50		
Bristol,Conn W1			12.50	15.00	
Franklin Park,Ill T6			12.50	15.00	18.00
Harrison,N.J C18			12.50	15.00	18.00
New York W3			12.50	15.00	18.00
Trenton,N.J R5			12.50	15.00	18.00
Worcester,Mass T6			12.50	15.00	18.00
Worcester,Mass W12			12.50		
Youngstown,O S6			12.50	15.00	18.00

SILICON STEEL

SHEETS, SILICON, H.R. or C.R (22 Ga.) COILS (cut lengths 1/2c lower)	Field	Armature	Electric	Motor	Dynamo
Beech Bottom,W.Va.(cut lengths)			8.35	9.60	10.40
Brackenridge,Pa. A1			8.85	10.10	10.90
Granite City,Ill. G1 (cut lengths)			8.55	9.80	
Indiana Harbor,Ind. I-2	8.05	8.35	8.85	(34)	
Mansfield,O. E6 (cut lengths)	7.55	7.85	8.35	9.60	10.40
Newport,Ky. N9 (cut lengths)		7.85	8.35	9.60	10.40
Niles,O. N12 (cut lengths)	7.55	7.85	8.35		
Vandergrift,Pa. U5		8.35	8.85	10.10	10.90
Warren,O. R2	8.05	8.35	8.85	10.10	10.90
Zanesville,O. A10		8.35	8.85	10.10	10.90

SHEET, SILICON (22 Ga. Base) COILS (Cut Lengths 1/2c lower)	Transformer Grade 72	65	58	52
Beech Bottom,W.Va.(cut lengths)	10.95	11.50	12.20	13.00
Brackenridge,Pa. A1	11.45			
Newport,Ky. N9 (cut lengths)	10.95			
Vandergrift,Pa. U5	11.45	12.00	12.70	13.50
Warren,O. R2	11.45			
Zanesville,O. A10	11.45	12.00	12.70	13.50

H.R. or C.R. COILS AND CUT LENGTHS, SILICON (22 Ga.)	T-100	T-90	T-80	T-73
Butler,Pa. A10 (C.R.)			16.05	16.55
Vandergrift,Pa. U5	11.00	11.55	15.55	16.35

TIN MILL PRODUCTS

TIN PLATE, Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$7.40	$7.65	$8.05
Fairfield,Ala. T2	7.50	7.75	8.15
Fairless,Pa. U5	7.50	7.75	8.15
Gary,Ind. U5	7.40	7.65	8.05
Granite City,Ill. G1	7.60	7.85	8.25
Indiana Harbor,Ind. I-2, Y1	7.40	7.65	8.05
Irvin,Pa. U5	7.40	7.65	8.05
Niles,O. R2	7.40	7.65	8.05
Pittsburg,Calif. C11	8.15	8.40	8.80
Sparrows Point,Md. B2	7.50	7.75	8.15
Weirton,W.Va. W6	7.40	7.65	8.05
Yorkville,O. W10	7.40	7.65	8.05

TIN PLATE, American 1.25 1.50 Coke (Base Box)	lb	lb
Aliquippa,Pa. J5	$8.50	$8.80
Fairfield,Ala. T2	8.50	8.80
Fairless,Pa. U5	8.50	8.80
Gary,Ind. U5	8.50	8.80
Ind.Har. I-2, Y1	8.50	8.80
Irvin,Pa. U5	8.50	8.80
Pitts.,Cal. C11	9.15	9.70
Sp.Pt.,Md. B2	8.80	9.05
Warren,O. R2	8.70	8.90
Weirton,W.Va. W6	8.70	8.90
Yorkville,O. W10	8.70	8.90

BLACK PLATE (Base Box)	
Aliquippa,Pa. J5	$6.40
Fairfield,Ala. T2	6.60
Fairless,Pa. U5	6.60
Gary,Ind. U5	6.50
Granite City,Ill. G1	6.70
Ind.Harbor,Ind. I-2, Y1	6.50
Irvin,Pa. U5	6.50
Niles,O. R2	6.50
Pittsburg,Calif. C11	7.25
Sparrows Point,Md. B2	6.60
Warren,O. R2	6.50
Weirton,W.Va. W6	6.50
Yorkville,O. W10	6.50

HOLLOWARE ENAMELING Black Plate (29 gage)	
Follansbee,W.Va. F1	6.10
Gary,Ind. U5	6.10
Granite City,Ill. G1	6.30
Ind.Harbor,Ind. Y1	6.10
Irvin,Pa. U5	6.10
Yorkville,O. W10	6.10

MANUFACTURING TERNES (Special Coated)	
Fairfield,Ala. T2	$7.85
Gary,Ind. U5	7.75
Irvin,Pa. U5	7.75
Yorkville,O. W10	7.75

MANUFACTURING TERNES, 8 lb (Commercial Quality)	
Gary,Ind. U5	$9.75
Yorkville,O. W10	9.75

MANUFACTURING TERNES, LT Coated, 6 lb	
Yorkville,O. W10	$8.65

ROOFING SHORT TERNES (8 lb Coated)	
Gary,Ind. U5	9.75

—WIRE—

WIRE, Manufacturers Bright, Low Carbon	
Alabama City,Ala. R2	5.525
Aliquippa,Pa. J5	5.525
Alton,Ill. L1	5.70
Atlanta A11	5.725
Bartonville,Ill. K1	5.625
Buffalo W12	5.525
Chicago W13	5.525
Cleveland A7, C20, R2	5.525
Crawfordsville,Ind. M8	5.625
Donora,Pa. A7	5.525
Duluth,Minn. A7	5.525
Fairfield,Ala. T2	5.525
Fostoria,O. C21, S1	5.75
Houston S5	5.925
Johnstown,Pa. B2	5.525
Joliet,Ill. A7	5.525
Kansas City,Mo. S5	6.125
Kokomo,Ind. C16	5.625
Los Angeles B3	6.475
Minnequa,Colo. C10	5.775
Monessen,Pa. P7	5.625
No Tonawanda,N.Y. B11	5.625
Palmer,Mass. W12	5.825
Pittsburg,Calif. C11	6.475
Portsmouth,O. P12	5.525
Rankin,Pa. A7	5.625
So.Chicago,Ill. R2	5.525
So.SanFrancisco,Calif. C10	6.475
Sparrows Point,Md. B2	5.625
Sterling,Ill. C1, N15	5.525
Struthers,O. Y1	5.525
Waukegan,Ill. A7	5.525
Worcester,Mass. A7	5.825

WIRE, MB Spring, High Carbon	
Aliquippa,Pa. J5	6.925
Alton,Ill. L1	7.10
Bartonville,Ill. K1	7.025
Buffalo,W12	6.925
Cleveland A7	6.925
Donora,Pa. A7	6.925
Duluth,Minn. A7	6.925
Fostoria,O. S1	6.925
Johnstown,Pa. B2	6.925
Los Angeles B3	7.875
Millbury,Mass.(12) N6	*7.225*
Minnequa,Colo. C10	7.175
Monessen,Pa. P7	6.925
Monessen,Pa. P16	6.925
Muncie,Ind. I-7	7.125
Palmer,Mass. W12	7.225
Pittsburg,Calif. C11	7.875
Portsmouth,O. P12	6.925
Roebling,N.J. R5	7.225
So.Chicago,Ill. R2	6.925
So.SanFran. C10	7.875
Sparrows Pt.,Md. B2	7.025
Struthers,O. Y1	6.925
Trenton,N.J. A7	7.225
Waukegan,Ill. A7	6.925
Worcester,A7, J4	7.225
Worcester,T6, W12	7.225

WIRE, Upholstery Spring	
Aliquippa,Pa. J5	6.625
Alton,Ill. L1	6.80
Buffalo,W12	6.625
Cleveland A7	6.625
Donora,Pa. A7	6.625
Duluth,Minn. A7	6.625
Johnstown,Pa. B2	6.625
Los Angeles B3	7.575
Minnequa,Colo. C10	6.875
Monessen,Pa. P7, P16	6.625
New Haven,Conn. A7	6.925
Palmer,Mass. W12	6.925
Pittsburg,Calif. C11	7.575
Portsmouth,O. P12	6.625
Roebling,N.J. R5	6.925
So.Chicago,Ill. R2	6.625
So.SanFrancisco,Calif. C10	7.575
Sparrows Point,Md. B2	6.725
Trenton,N.J. A7	6.925
Waukegan,Ill. A7	6.625
Worcester,Mass. A7	6.925

WIRE, Fine & Weaving (8" Coils)	
Alton,Ill. L1	10.75
Bartonville,Ill. K1	10.65
Buffalo,W12	10.55
Chicago W13	10.55
Cleveland A7	10.55
Crawfordsville,Ind. M8	10.55
Fostoria,O. S1	10.55
Johnstown,Pa. B2	10.55
Kokomo,Ind. C16	10.55
Monessen,Pa. P16	10.55
Muncie,Ind. I-7	10.75
Palmer,Mass. W12	10.85
Roebling,N.J. R5	10.85
So.SanFrancisco,Calif. C10	10.90
Waukegan,Ill. A7	10.55
Worcester,Mass. A7, T6	10.85

WIRE, Galv'd ACSR for Cores	
Bartonville,Ill. K1	9.50
Buffalo,W12	9.50
Johnstown,Pa. B2	9.50
Monessen,Pa. P16	9.50
Muncie,Ind. I-7	9.70
Roebling,N.J. R5	9.80
Sparrows Pt.,Md. B2	9.60

ROPE WIRE	(A)
Alton,Ill. L1	9.45
Bartonville,Ill. K1	9.35
Buffalo W12	9.35
Fostoria,O. S1	9.45
Johnstown,Pa. B2	9.35
Monessen,Pa. P7, P16	9.35
Muncie,Ind. I-7	9.55
Palmer,Mass. W12	9.65
Portsmouth,O. P12	9.35
Roebling,N.J. R5	9.65
Sparrows Pt. B2	9.45
Struthers,O. Y1	9.55
Worcester,Jl, T6	9.65

(A) Plow and Mdd Plow; add 0.2c for improved plow.

WIRE, Tire Bead	
Alton,Ill. L1	12.75
Bartonville,Ill. K1	12.65
Monessen,Pa. P16	12.55
Roebling,N.J. R5	12.85

WIRE, Cold-Rolled Flat	
Anderson,Ind. G6	7.45
Buffalo W12	7.45
Cleveland A7	7.45
Crawfordsville,Ind. M8	7.55
Dover,O. G6	7.45
Fostoria,O. S1	7.45
Kokomo,Ind. C16	7.55
Franklin Park,Ill. T6	7.60
Massillon,O. R8	7.45
Monessen,Pa. P16	8.00
Monessen,Pa. P7	7.45
Pawtk't,R.I.(12) N8	7.75
Trenton,N.J. R5	7.75
Worcester,A7, T6, W12	7.75

WIRE, Merchant Quality (6 to 8 gage)	An'ld. Galv.
Ala.City,R2	6.675 7.075**
Aliquippa,J5	6.675 7.20*
Atlanta A11	6.775 7.30
Bartonville(9)K1	6.675 7.225
Buffalo U12	6.675 7.075†
Cleveland A7	6.675
Crawfordsville M8	6.775 7.325
Donora,Pa. A7	6.675 7.075†
Duluth,Minn. A7	6.675 7.075†
Fairfield,T2	6.675 7.075†
Houston,Tex. S5	7.075 7.475
Johnstown B2(4S)	6.675 7.225*
Joliet,Ill. A7	6.675 7.075†
Kansas City,Mo. S5	7.275 7.675
Kokomo C16	6.775 7.175
Los Angeles B3	7.625
Minnequa C10	6.925 7.325**
Monessen P7(4S)	6.675 7.225*
Palmer W12	6.975 7.375†
Pitts. Calif. C11	7.625 8.025†
Rankin A7	6.675 7.075†
So.Chicago R2	6.675 7.075**
S.S.Fran.(4S) C10	7.625 8.025**
Sparrows Pt.B2(4S)	6.775 7.325*
Sterling(4S) N15	6.675 7.225
Struthers,O. Y1	6.675 7.175
Worcester A7	6.975

* Based on 10c zinc; † 5c zinc; ** Subject to zinc equalization extras.

BALE TIES, Single Loop	Col.
Alabama City,Ala. R2	149
Atlanta,A11	151
Bartonville,Ill.(19) K1	149
Crawfordsville,Ind. M8	151
Donora,Pa. A7	149
Duluth,Minn. A7	149
Fairfield,Ala. T2	149
Joliet,Ill. A7	149
Kansas City,Mo. S5	161
Kokomo,Ind. C16	151
Minnequa,Colo. C10	151
Pittsburg,Calif. C11	173
So.Chicago, Ill. R2	149
So.SanFran.,Calif. C10	173
Sparrows Point,Md. B2	151
Sterling,Ill.(1) N15	149

WOVEN FENCE, 9-15½ Ga.	Col.
Ala.City,Ala. R2	140**
Ala.City 17 ga. R2	235**
Ala.City 18 ga. R2	245**
Aliquippa,Pa 9-14½ ga.	J5 143*
Atlanta A11	145
Bartonville,Ill.(19)	K1 143
Crawfordsville,Ind.	M8 145
Donora,Pa.	A7 140†
Duluth,Minn.	A7 140†
Fairfield,Ala.	T2 140†
Houston,Tex.	S5 148
Johnstown,Pa.	B2 143
Johnstown 17 ga.	6"B2 231
Johnstown 4"	B2 237
Joliet,Ill.	A7 140†
Kansas City,Mo.	S5 162
Kokomo,Ind.	C16 142
Minnequa,Colo.	C10 148**
Monessen,Pa. 9 ga.	P7 145
Pittsburg,Calif.	C11 163*
Rankin,Pa.	A7 140†
So.Chicago,Ill.	R2 140**
Sterling,Ill. (1)	N15 143

* Based on 5c zinc; ** 11c zinc; ** Subject to zinc equalization extras.

WIRE, Barbed	Col.
Alabama City	R2 153**
Aliquippa	J5 150*
Atlanta	A11 158
Bartonville,Ill.	(19) K1 156
Crawfordsville,Ind.	M8 159
Donora,Pa.	A7 153†
Duluth,Minn.	A7 153†
Fairfield,Ala.	T2 153†
Houston,Tex.	S5 161
Johnstown,Pa.	B2 156*
Joliet,Ill.	A7 153
Kansas City,Mo.	S5 165
Kokomo,Ind.	C16 155
Minnequa,Colo.	C10 159**
Monessen,Pa.	P7 157
Pittsburg,Calif.	C11 173†
Rankin,Pa.	A7 153†
So.Chicago,Ill.	R2 153**
S.SanFrancisco,Calif.	C10 173**
Sparrows Point,Md.	B2 158*
Sterling,Ill.	(1) N15 143

* Based on 5c zinc; * 11c zinc; ** Subject to zinc equalization extras.

WIRE, (16 gage)	An'ld. Galv. Stone	Stone
Ala.City	R2	12.50 14.05**
Aliquippa	J5	12.50 14.30*
Bartonville(19)	K1	10.73 12.51
Buffalo	W12	12.50
Cleveland	A7	12.50
Crawfordsville	M8	12.50 14.35
Fostoria,O.	S1	12.60 14.15
Johnstown	B2	12.50 14.35*
Kokomo	C16	12.60 14.15
Minnequa	C10	12.75 14.45**
Palmer,Mass.	W12	12.50 14.05†
Pitts.,Calif.	C11	12.85 14.40†
Sparrows Pt.	B2	12.60 14.45*
Sterling(1)	N15	10.73 12.15
Waukegan	A7	12.50 14.05†
Worcester	A7	12.80

* Based on 11c zinc; 45c zinc; ** Subject to zinc equalization extras.

NAILS, Stock To dealers & mfrs. (7)	Col.
Alabama City,Ala.	R2 131
Aliquippa,Pa.	J5 131
Atlanta	A11 133
Bartonville,Ill.	(19) K1 131
Chicago,Ill.	W13 131
Cleveland	A9 137
Crawfordsville,Ind.	M8 133
Donora,Pa.	A7 131
Duluth,Minn.	A7 131
Fairfield,Ala.	T2 131
Galveston,Tex.	D7 139
Houston,Tex.	S5 139
Johnstown,Pa.	B2 131
Joliet,Ill.	A7 131
Kansas City,Mo.	S5 143
Kokomo,Ind.	C16 133
Minnequa,Colo.	C10 136
Monessen,Pa.	P7 131
Pittsburg,Calif.	C11 150
Rankin,Pa.	A7 131
So.Chicago,Ill.	R2 131
Sparrows Pt.,Md.	B2 133
Sterling,Ill.	(1) N15 131
Worcester,Mass.	A7 137

NAILS, Cut (100 lb keg) To dealers (33)	
Conshohocken,Pa.	A3 $8.00
Wheeling,W.Va.	W10 8.00

STAPLES, Polished, Stock To dealers & mfrs. (7)	Col.
Alabama City,Ala.	R2 133
Aliquippa,Pa.	J5 133
Atlanta	A11 135
Bartonville,Ill.	(19) K1 133
Crawfordsville,Ind.	M8 135
Donora,Pa.	A7 133
Duluth,Minn.	A7 133
Fairfield,Ala.	T2 133
Johnstown,Pa.	B2 133
Joliet,Ill.	A7 133
Kokomo,Ind.	C16 135
Minnequa,Colo.	C10 138
Monessen,Pa.	P7 133
Pittsburg,Calif.	C11 152
Rankin,Pa.	A7 133
So.Chicago,Ill.	R2 133
Sparrows Pt.,Md.	B2 135
Sterling,Ill.	(1) N15 133
Worcester,Mass.	A7 139

—FENCE POSTS—

	Col.
Chicago Hts.,Ill.	C2, I-2 145
Duluth,Minn.	A7 (19) 145
Franklin,Pa.	F5 145
Johnstown,Pa.	B2 145
Marion,O.	P11 145
Minnequa,Colo.	C10 150
Moline,Ill.	R2 145
So.Chicago,Ill.	R2 145
Tonawanda,N.Y.	B12 148
Williamsport,Pa.	S19 158

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Sizes—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.06		$1.45		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv
Aliquippa, Pa. J5 (‡)	15.75	list	19.75	2.5	22.25	5	23.75	6.5	23.75	6.5	23	5.75	25.5	8.25
Ambridge, Pa. N2 (‡)	15.75	...	19.75	...	22.25	...	23.75	...	23.75	...	23	...	25.5	...
Lorain, O. N3 (*)	15.75	4.5	19.75	5.5	22.25	8	23.75	9.5	23.75	9.5	23	8.75	25.5	11.25
Youngstown Y1 (‡‡)	15.75	list	19.75	2.5	22.25	5	23.75	6.5	23.75	6.5	23	5.75	25.5	8.25

ELECTRIC WELD STANDARD PIPE, Theaded and Coupled

Carload discounts from list, %

Youngstown R2 (**)	15.75	0.75	19.75	3	22.25	5.5	23.75	7	23.75	7	23	6.25	25.5	8.75

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Sizes—Inches	⅛		¼		⅜		½		¾		1		1¼		1½	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c		27.5c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28		2.73	
	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv
Aliquippa, Pa. J5 (‡)	...	...	...	...	...	...	26.25	10	29.25	14	31.75	17.5	34.25	18.5	34.75	19.5
Alton, Ill. L1 (‡)	...	...	...	...	...	...	24.25	8	27.25	13	29.75	16.5	32.25	17.5	32.75	18.25
Benwood, W. Va. W10(‡‡)	25.5	+0.25	17.75	+5.5	10.25	+10	26.25	11	29.25	15	31.75	18.5	34.25	19.5	34.75	20.25
Butler, Pa. F6 (‡)	26.5	+2.75	19.5	+7.25	12.5	+13	...	...	...	...	...	...	...	...	...	...
Etna, Pa. N2 (‡)	...	...	...	...	...	...	26.25	7	29.25	11	31.75	14.5	34.25	16.25	34.75	17.25
Fontana, Calif. K1 (§)	...	...	...	...	...	...	13.25	+3	16.25	1	18.75	4.5	21.25	5.5	21.75	6.5
Ind. Harbor Y1 (‡‡)	...	...	...	...	...	...	23.25	6	28.25	13	30.75	16.5	33.25	17.5	33.75	18.5
Lorain, O. N3 (*)	...	...	...	...	...	...	26.25	16	29.25	20	31.75	23.5	34.25	23	34.75	24
Sharon, Pa. S4 (‡)	26.5	+0.25	19.50	+4.25	12.5	+8.5	...	...	...	...	...	...	...	...	...	...
Sharon, Pa. M6	...	...	...	...	...	...	26.25	11	29.25	15	31.75	18.5	34.25	19.25	34.75	20.25
Sparrows Pt., Md. B2 (§)	24.5	+1.75	17.5	+6.25	10.5	+10.5	24.25	8	27.25	12	29.75	15.5	32.25	16.5	32.75	17.5
Youngstown R2 (**)	...	...	...	...	...	...	26.25	11	29.25	15	31.75	18.5	34.25	19.25	34.75	20.25
Youngstown Y1 (‡‡)	...	...	...	...	...	...	26.25	10	29.25	14	31.75	17.5	34.25	18.5	34.75	19.5
Wheatland, Pa. W9 (§)	24.5	+1.75	17.5	+6.25	10.5	+10.5	26.25	10	29.25	14	31.75	17.5	34.25	18.5	34.75	19.5

Size—Inches	2		2½		3		3½		4	
List Per Ft	37c		58.5c		76.5c		92c		$1.06	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89	
	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv
Aliquippa, Pa. J5 (‡)	35.25	20	36.75	20	36.75	20	...	...	...	...
Alton, Ill. L1 (§)	33.25	18-75	34.75	18	34.75	18	...	...	...	...
Benwood, W.Va. W10(‡‡)	35.25	20.75	36.75	20.5	36.75	20.5	27.75	11	27.75	11
Etna, Pa. N2 (‡)	35.25	17.25	36.75	18.5	36.75	18.5	27.75	9	27.75	9
Fontana, Calif. K1 (§)	22.25	7	23.75	7	23.75	7	...	...	...	...
Ind. Harbor, Ind. Y1 (‡‡)	34.25	19	35.75	19	35.75	19	...	...	...	...
Lorain, O. N3 (*)	35.25	24.5	36.75	23	36.75	23	...	...	...	...
Sharon, Pa. M6	35.25	20.75	36.75	20.5	36.75	20.5	...	...	...	...
Sparrows Pt., Md. B2 (§)	32.25	18	34.75	18	34.75	18	25.75	8.5	25.75	8.5
Youngstown R2 (**)	35.25	20.75	36.75	20.5	36.75	20.5	27.75	11	27.75	11
Youngstown Y1 (‡‡)	35.25	20	36.75	20	36.75	20	...	...	...	...
Wheatland, Pa. W9 (‡)	35.25	20	36.75	20	36.75	20	...	...	...	...

Galvanized pipe discounts based on zinc price of: (‡), 11c; (‡‡), 11c to under 12c; (*), 5c; (§), 10c to under 11c; (**), 10.50c-11.50c; with discounts adjusted on prices of zinc at time of shipment.

BOILER TUBES

Net base c.l. prices, dollar per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	...	21.31	18.44
1¼	13	...	25.24	18.12
1½	13	23.12	27.86	20.01
1¾	13	26.84	32.37	23.66
2	13	30.08	36.28	26.51
2¼	13	34.18	41.23	29.86
2½	12	37.10	44.75	32.41
2¾	12	40.51	48.86	33.70
3	12	43.85	52.90	38.66
3½	12	45.92	55.39	41.23

RAILWAY MATERIALS

RAILS	Std. No. 1	Std. No. 2	Std. Tee Rails All No. 2	Std. Tee Rails 60 lb Under
Bessemer,Pa. U5	4.325	4.225	4.275	5.20
Ensley,Ala. T2	4.325	4.225		5.20
Fairfield,Ala. T2				5.20
Gary,Ind. U5	4.325	4.225	4.275	
Huntington,W.Va. W7				5.20
IndianaHarbor,Ind. I-2	4.325	4.225	4.275	
Johnstown,Pa. B2				(16)5.20
Lackawanna,N.Y. B2	4.325	4.225		5.20
Minnequa,Colo. C10	4.325	4.125		5.70
Steelton,Pa. B2	4.325	4.225		
Williamsport,Pa. S10				5.20

TIE PLATES	
Fairfield,Ala. T2	5.15*
Gary,Ind. U5	5.125
Ind Harbor,Ind. I-2	5.125
Lackawanna,N.Y. B2	5.125
Minnequa,Colo. C10	5.125
Pittsburg,Calif. C11	5.275
Seattle B3	5.275
Steelton,Pa. B2	5.125
Torrance,Calif. C11	5.275

TRACK BOLTS (20) Treated	
KansasCity,Mo. S5	11.00
Lebanon,Pa. B2	11.00
Minnequa,Colo. C10	11.00
Pittsburgh O3, P14	11.00

JOINT BARS	
Bessemer,Pa. U5	5.275
Fairfield,Ala. T2	5.275
Ind Harbor,Ind. I-2	5.275
Joliet,Ill. U5	5.275
Lackawanna,N.Y. B2	5.275
Minnequa,Colo. C10	5.275
Steelton,Pa. B2	5.275

AXLES	
Ind Harbor,Ind. S13	6.50
Johnstown,Pa. B2	6.50

STANDARD TRACK SPIKES	
Ind Harbor,Ind. I-2, Y1	7.05
KansasCity,Mo. S5	7.30
Lebanon,Pa. B2	7.05
Minnequa,Colo. C10	7.05
Pittsburgh, Jo	7.05
Seattle B3	7.55
So.Chicago,Ill. R2	7.05
Struthers,O. Y1	7.05
Youngstown R2	7.05

RIVETS

F.o.b. Cleveland, and/or freight equalized with Pittsburgh, f.o.b. Chicago, and/or freight equalized with Birmingham except where equalization is too great.

Structural ⅞-in. larger x-one	
⅞-in. under	26.5 off

WASHERS, WROUGHT

F.o.b. shipping point, to jobbers	List

BOLTS, NUTS

CARRIAGE, MACHINE BOLTS

(F.o.b. midwestern plants, per cent off list for less than case lots to consumers)

6 in. and shorter:	
½-in. & smaller diam.	4
⅝-in. & ¾-in.	5
⅞-in. and larger	3
Longer than 6 in.:	
All diams	+4
Lag bolts; all diams.:	
6 in. and shorter	12
Over 6 in. long	8
Ribbed Necked Carriage	5
Blank	25
Plow	25
Step, Elevator, Tap and Sleigh Shoe	12
Tire Bolts	List
Boiler & Fitting-Up Bolts	23

NUTS

H.P. & C.P., regular & heavy:	
Square, all sizes	58
H.P., Hex, regular & heavy:	
⅝" and smaller	58
¾" to 1¼", inclusive	60
1⅜" to 1½", inclusive	62
1⅝" and larger	58
C.P., Hex, regular heavy:	
All sizes	58
Hot Galv. Nuts (all types):	
¾" and smaller	10
⅞" to 1½", inclusive	11
Finished Hex. Nuts:	
New standard, all sizes	58
Semifinished & Slotted Hex. Regular and heavy, all sizes	58

SQUARE HEAD SET SCREWS

(Packaged, per cent off list)

1 in. diam x 6 in. and shorter	31
1 in. and smaller diam x over 6 in.	20

HEADLESS SET SCREWS

(Packaged, per cent off list)

No. 10 and smaller	31
¼-in. diam & larger	11
N.F. thread, all diams	8

STEEL STOVE BOLTS

(F.o.b. plant, per cent off list in packages)	
Plain finish	17.5 & 10
Plated finishes	30 x 10

HEXAGON CAP SCREWS

(1020 steel, packaged, per cent off list)	
6 in. or shorter:	
⅝-in. & smaller	38
¾-in. through 1 in.	22
Longer than 6 in.:	
⅝-in. and smaller	20
¾-in. through 1 in.	7

METAL POWDERS

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh except as otherwise noted.)

Sponge iron	Cents
98.7% Fe, annealed	18.00
Unannealed	14.50
Swedish, c.l., N.Y.	
1 in bags	11.25
Electrolytic iron:	
Annealed, 99.5% Fe	42.50
Unannealed (99.5%) Fe	36.50
Hydrogen-reduced (99.5%) Fe, minus 325 mesh	53.50
Powder Flakes, minus 16 plus 100 mesh	31.00
Carbonyl Iron:	
97.5-99.8% size 5 to 10 microns	3.00-148.00
Aluminum:	
Atomized, 500 lb drums, freight allowed:	
Carlots	31.00
Ton lots	34.00
Antimony, 500 lb lots	32.00*
Brass, 20-ton lots	29.25-36.50
Bronze, 10-ton lots	31.00-60.00
Copper:	
Electrolytic	13.50*
Reduced	13.50*
Lead	7.50*
Magnesium	7.00-8.00
Manganese:	
Minus 35 mesh	61.00
Minus 100 mesh	67.00
Minus 200 mesh	72.00
Nickel, unannealed	85.50
Nickel-Silver, 5-ton lots	47.00
Silicon	43.50
Solder	8.50*
Stainless Steel, 302	91.00
Tin	14.00*
Zinc, 10-ton lots	17.50-25.00
Tungsten	Dollars
Melting grade, 99% 60 to 200 mesh:	
1000 lb and over	5.35
Less than 1000 lb	5.60
Chromium, electrolytic 99.9% Cr min	3.60

*Plus cost of metal.

Footnotes

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) 13⅝" to 17/16", 17/16" to 1 15/16" 4.55c; 1 15/16" to 2 5/16" 4.85c.
(6) Chicago or Birm. base.
(7) To jobbers, 6 cwt. lower.
(8) 16 gage and heavier.
(9) 6 in. and narrower.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass. base.
(13) Add 0.25c for 12 Ga. & heavier.
(14) Gage 0.143 to 0.249 in., for gage 0.142 and lighter, 5.80c.
(15) ½" and thinner.
(16) 10 lb and under.
(17) Flats, only, 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) 0.25c off for uncoated.
(21) New Haven, Conn. base.
(22) Del. San Francisco Bay area.
(23) 20 Ga. 36" wide.
(24) Deduct 0.10c, finer than 15 Ga.
(25) Bar mill basis.
(26) Reinforcing mill lengths to fabricators; to consumers, 40c.
(27) Bar mill sizes.
(28) Reinforced.
(29) Youngstown base.
(30) Sheared; add 0.35c for universal mill.
(31) Base, delv. within mill county.
(32) To jobbers, deduct 20c.
(33) 9.60c for cut lengths.
(34) 22" and narrower.
(35) 24" and narrower.
(36) 12 gage & lighter, 60" & narrower.
(37) 14 gage & lighter, 48" and narrower.
(38) 48" and narrower.
(39) Lighter than 0.035", 0.035" and heavier, 0.25c higher.
(40) 0.10c for cut lengths.
(41) 6 gage.
(42) T post, deduct 2 cwt. for 4 post.

STAINLESS STEEL MILL PRICES

(Representative prices, cents per pound; subject to current lists of extras)

AISI Type	Rerolling Ingots	Rerolling Slabs, Billets	Forging Billets	Seamless Tube Billets	H.R. Strip	Shapes; H.R. & C.F. Bars; Wire	Plates	Sheets	C.R. Strip; Flat Wire
301	16.25	20.50	29.50	34.25	29.75	35.25	37.25	46.25	38.25
302	17.25	22.75	29.75	34.50	32.00	35.50	37.50	46.50	41.50
302B	18.50	24.50	30.50	34.50	35.00	35.50	37.50	48.75	44.75
303	18.75	24.75	32.25	37.25	36.75	38.25	39.75	48.75	45.50
304	18.25	23.75	31.00	36.00	34.25	37.25	39.75	48.75	43.75
304L	....	....	36.75	....	....	42.75	45.25	54.25	49.00
306	19.50	25.50	....	36.25	37.00	37.50	42.00	51.75	46.75
308	19.75	26.25	35.25	40.75	38.00	42.00	46.00	55.25	48.00
309	26.50	34.75	43.25	49.25	49.25	50.50	53.75	63.50	62.00
309S	28.50	37.50	47.50	54.50	54.00	55.50	59.00	68.50	68.50
310	33.00	43.25	56.75	66.25	67.50	67.50	69.00	72.25	78.75
314	....	....	....	....	....	....	69.00	74.50	....
316	28.00	36.25	46.75	54.50	55.00	55.50	59.00	64.50	66.50
316L	....	....	52.50	....	....	61.00	64.25	70.00	72.00
317	33.00	43.50	58.25	66.75	67.50	68.25	70.75	77.00	79.25
318	33.50	44.00	55.25	64.50	66.25	65.50	68.75	78.00	80.25
321	22.75	29.50	35.25	40.75	42.00	42.00	46.00	55.50	54.50
330	....	....	58.00	....	....	68.50	70.00	73.75	77.75
347	24.50	32.25	39.50	45.75	46.50	46.75	51.25	60.75	59.25
403	....	....	27.00	30.75	....	32.00	34.25	44.00	41.25
405	16.50	21.75	25.25	29.25	30.50	30.25	31.75	42.50	39.75
410	14.00	18.25	24.00	27.75	26.25	28.75	30.00	40.75	34.25
416	....	....	24.50	28.25	....	29.25	30.50	41.25	41.25
420	22.00	28.50	29.25	34.00	35.50	35.00	38.50	49.25	52.75
430	14.25	18.50	24.50	28.25	27.00	29.25	30.50	43.50	34.75
430F	....	18.75	25.00	28.75	....	29.75	31.00	44.00	44.00
431	14.50	28.50	25.00	28.25	27.50	29.25	30.50	44.00	35.25
440A,B,C	....	28.50	29.25	34.00	....	35.00	38.50	49.25	52.75
442	....	....	....	28.00	....	30.50	35.25	48.25	47.75
446	....	....	....	33.75	38.25	53.00	39.50	40.75	59.75	71.00
501	....	....	....	14.00	14.50	21.25	16.00	18.25	30.50	29.00
502	....	....	....	15.25	16.00	22.25	17.00	20.00	31.75	30.00

Stainless Steel Producers Are: Allegheny Ludlum Steel Corp.; Alloy Metal Wire Co. Inc.; American Steel & Wire Div., U. S. Steel Corp.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; G. O. Carlson Inc.; Carpenter Steel Co.; Charter Wire Products Co.; Cold Metal Products Co.; Crucible Steel Co. of America; Damascus Tube Co.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Ellwood Ivins Steel Tube Works Inc.; Firth Sterling Inc.; Ft. Wayne Metals Inc.; Globe Steel Tubes Co.; Helical Tube Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg Warner Corp.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Joslyn Mfg. & Supply Co.; Kenmore Metals Corp.; Maryland Fine & Specialty Wire Co.; McLouth Steel Corp.; Metal Forming Corp.; McInnes Steel Co.; National-Standard Co.; National Tube Div., U. S. Steel Corp.; Newman-Crosby Steel Co.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Rodney Metals Inc.; Rome Mfg. Co.; Rotary Electric Steel Co., Sharon Steel Corp.; Shenango Agaloy Tube Co.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Spencer Wire Corp.; Stainless Welded Products Inc.; Standard Tube Co.; Superior Steel Corp.; Superior Tube Co.; Timken Roller Bearing Co.; Trent Tube Co.; Tube Methods Inc.; United States Steel Corp.; Universal-Cyclops Steel Co.; Wallingford Steel Co.; Washington Steel Corp.

CLAD STEEL

Cladding Stainless	Plates, Carbon Base 10%	Plates, Carbon Base 20%	Sheets, Carbon Base 20%	Sheets, Copper Base Both Sides
302	....	31.00	31.00	77.00
304	27.60	32.50-32.70	32.50	77.00
310	36.50	41.00	.....	144.00
316	32.60	37.70-42.75	42.75	....
318	37.00	42.20	.....	....
321	29.30	34.40-37.00	37.00	111.00
347	30.40	35.50-40.50	40.50	130.00
405	23.40	30.60	.....	....
410	22.90	30.10	.....	....
430	22.90	30.10	.....	....
Inconel	41.23	54.18	.....	165.00
Nickel	37.50	50.90	.....	....
Monel	38.90	51.80	.....	....
Copper*	....	.....	46.00	....

	Strip, Carbon Base, Cold-Rolled 10%	Strip, Carbon Base, Cold-Rolled Both Sides	Strip, Carbon Base, Hot-Rolled 10%	Strip, Carbon Base, Hot-Rolled Both Sides
Copper*	27.85	35.85	24.00	32.25

*Deoxidized. Production points: Stainless sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4 and Washington, Pa. J3; nickel, inconel, monel-clad plates Coatesville L7; copper-clad strip, Carnegie, Pa. S18. Production point for copper-base sheets is Carnegie, Pa. A13.

TOOL STEEL

Grade	$ per lb	Grade	$ per lb
Regular Carbon	0.25-.285	5% Cr Hot Work	0.39
Extra Carbon	0.33-.340	W-Cr Hot Work	0.41
Special Carbon	0.35-.360	V-Cr Hot Work	0.43
Oil Hardening	0.370-.39	Hi-Carbon-Cr.	0.665-.70

Grade by Analysis (%)

W	Cr	V	Co	Mo	$ per lb
20	4.25	1.6	12.25	....	4.055
18	4.25	1	4.75	....	2.340
18	4	2	9	....	2.565-2.695
18	4	2	....	....	1.820
18	4	1	....	....	1.580-1.660
13.5	4	3	....	....	1.875
6.4	4.5	1.9	....	5	1.065
6	4	3	....	6	1.300
2	1.4	1.2	....	....	0.495
1.5	4	1	....	8.5	0.895

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, D4, F2, J3, L3, M14, S8, U4, V2 and V3.

PIG IRON, Gross Ton

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax.

	Basic	No. 2 Foundry	Malleable	Bessemer
Birmingham District				
AlabamaCity R2	52.38	52.88	....	....
Birmingham R2	52.38	52.88	....	....
Birmingham U6	....	52.88	....	....
Woodward,Ala. W15	52.38	52.88	56.50†	....
Cincinnati, deld.	....	60.43	....	....
Buffalo District				
Buffalo R2, H1	56.00	56.50	57.00	....
Tonawanda,N.Y. W12	56.00	56.50	57.00	....
No.Tonawanda,N.Y. T9	....	56.50	57.00	....
Boston, deld.	66.65	67.15	67.65	....
Rochester,N.Y., deld.	59.02	59.52	60.02	....
Syracuse,N.Y., deld.	60.12	60.62	61.12	....
Chicago District				
Chicago I-3	56.00	56.50	56.50	57.00
Gary,Ind. U5	56.00	....	56.50	....
IndianaHarbor,Ind. I-2	56.00	....	56.50	....
So.Chicago,Ill. W14, Y1	56.00	56.50	56.50	....
So.Chicago,Ill. U5	56.00	....	56.50	57.00
Milwaukee deld.	58.17	58.67	58.67	59.17
Muskegon,Mich., deld.	....	62.80	62.80	....
Cleveland District				
Cleveland A7	56.00	56.50	56.50	57.00
Cleveland R2	56.00	56.50	56.50	....
Akron,O. deld. from Cleve.	58.75	59.25	59.25	59.75
Lorain,O. N3	56.00	....	....	57.00
Mid-Atlantic District				
Bethlehem,Pa. B2	58.00	58.50	59.00	59.50
New York, deld.	....	62.28	62.78	....
Newark, deld.	61.02	61.52	62.02	62.52
Philadelphia, deld.	60.75	61.25	61.75	62.25
Birdsboro,Pa. B10	58.00	58.50	....	....
Steelton,Pa. B2	58.00	58.50	59.00	59.50
Swedeland,Pa. A3	58.00	58.50	59.00	59.50
Troy,N.Y. R2	58.00	58.50	59.00	....
Pittsburgh District				
Neville Island,Pa. P6	56.00	56.50	56.50	57.00
Pittsburgh (N&S sides), Ambridge, Aliquippa, deld.	57.37	57.87	57.87	58.37
McKeesRocks, deld.	57.04	57.54	57.54	58.04
Lawrenceville,Homestead, Wilmerding,Monaca, deld.	57.66	58.16	58.16	58.66
Verona,Trafford, deld.	58.19	58.69	58.69	59.19
Brackenridge deld.	58.45	58.95	58.95	59.45
Bessemer,Pa. U5	56.00	....	56.50	57.00
Clairton,Rankin,So.Duquesne,Pa. U5	56.00	....	....	....
McKeesport,Pa. N3	56.00	....	....	57.00
Midland,Pa. C18	56.00	....	....	....
Monessen,Pa. P7	56.00	....	....	....

	Basic	No. 2 Foundry	Malleable	Bessemer
Youngstown District				
Hubbard,O. Y1	....	....	56.50	....
Sharpsville,Pa. S6	56.00	56.50	56.50	57.00
Youngstown Y1	....	....	56.50	57.00
Youngstown U5	56.00	....	....	57.00
Mansfield,O., deld.	60.90	....	61.40	61.90
Duluth I-3	56.00	56.50	56.50	57.00
Erie,Pa. I-3	56.00	56.50	56.50	57.00
Everett,Mass. E1	59.50	63.00	63.50	....
Fontana,Calif. K1	62.00	62.50	....	....
Geneva,Utah C11	56.00	56.50	....	....
GraniteCity,Ill. G4	57.90	58.40	58.90	....
Ironton,Utah C11	56.00	56.50	....	....
LoneStar,Texas L6	52.00	52.50*	52.50	....
Minnequa,Colo. C10	58.00	59.00	59.00	....
Rockwood,Tenn. T3	....	....	56.50	....
Toledo,O. I-3	56.00	56.50	56.50	57.00
Cincinnati, deld.	61.76	62.26	....	....

*Low-phos. southern grade. †Phos., 0.30 max.

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos iron on which base is 1.75-2.00%.

Phosphorus: Deduct 38 cents per ton for P content of 0.70% and over.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1% or portion thereof.

Nickel: Under 0.50% no extra; 0.50-0.74%, incl., add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.0-6.50% silicon; add $1.50 for each 0.5% Si; 75 cents for each 0.5% Mn over 1%)

Jackson,O. G2, J1	$67.00
Buffalo H1	68.25

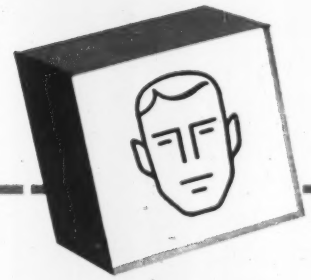
ELECTRIC FURNACE SILVERY PIG IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1.45 for each 0.5% Mn over 1%; $2 per gross ton premium for 0.045% max P)

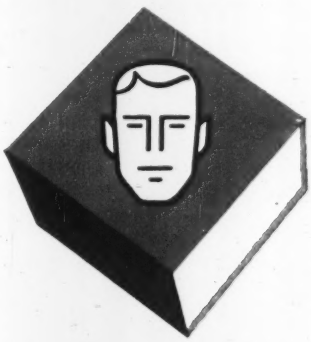
NiagaraFalls,N.Y. P15	$91.00
Keokuk,Iowa, Openhearth & Fdry, freight allowed K2	95.50
Keokuk, OH & Fdry, 12½ lb piglets, 16% Si, frt. allowed K2	98.50
Wenatchee,Wash. OH & Fdry, freight allowed K2	95.50

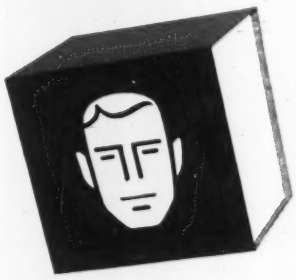
LOW PHOSPHORUS PIG IRON, Gross Ton

Cleveland, intermediate, A7	$61.00
Rockwood,Tenn. T3	70.00
Steelton,Pa. B2	64.00
Philadelphia, deld.	67.55
Troy,N.Y. R2	64.00



Are you getting the most out of YOUR ALLOY STEELS?





REPUBLIC 3-DIMENSION METALLURGICAL SERVICE

can help you answer this Question

You may be getting all the qualities you expect from the alloy steels you use. But you may not be taking advantage of some important properties which could make your products even better. Or cheaper to produce.

The best way to find out is to call in Republic's Three-Dimension Metallurgical Service. Here's how it works. First, Republic Field Metallurgist looks over your products and your plant. His report goes to the Republic Mill and Lab Metallurgists. All three then pool their knowledge of alloy steels, heat-treatment, and fabrication.

The results: recommendations that often mean better products, higher production and lower costs. And there are scores of Republic customers who have had this pleasant experience.

Whether your product is well established . . . or you're planning a new one . . . it will profit you to take advantage of this complete and extensive consulting service for steel users. It's available through your local Republic Steel Sales Office.

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...combines the extensive experience and coordinated abilities of Republic's *Field, Mill* and *Laboratory* Metallurgists with the knowledge and skills of your own engineers. It has helped guide users of Alloy Steels in countless industries to the correct steel and its most efficient usage. IT CAN DO THE SAME FOR YOU.

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Other Republic Products include Carbon and Stainless Steels—Sheets, Strip, Plates, Pipe, Bars, Wire, Pig Iron, Bolts and Nuts, Tubing

WAREHOUSE STEEL PRODUCTS

(Representative prices, cents per pound, subject to extras, f.o.b. warehouse. City delivery charges are 20 cents per 100 lb except: New York, 30 cents; Philadelphia, 25 cents; Birmingham, Cincinnati, St. Paul, 15 cents; Seattle and Spokane, Wash., no charge.)

	SHEETS			STRIP		BARS			Standard Structural Shapes	PLATES	
	Hot Rolled	Cold Rolled	Gal. 10 Ga.†	H.R.*	C.R.*	H.R. Rds.	C.F. Rds.‡	H.R. Alloy 4140††‖		Carbon	Floor
Baltimore	6.20	7.64	7.78	7.60		6.86	8.17§	12.04	6.98	6.85	7.98
Birmingham	6.10	7.60	8.00‖	6.30		6.15	8.90		6.35	6.35	8.65
Boston	6.89	7.83	9.18	7.13		6.87	8.35	12.28	7.06	7.13	8.26
Buffalo	6.18	7.15	8.96	6.79		6.35	7.70	12.17	6.59	6.68	7.88
Charlotte, N. C.	6.95	7.80	8.69	6.90		7.10	8.37		7.10	7.10	8.37
Chicago	6.18	7.12	8.00	6.42		6.28	7.30	11.75	6.46	6.33	7.46
Cincinnati	6.51	7.19	8.42	6.72		6.58	7.66	12.17	6.93	6.80	7.88
Cleveland	6.18	7.12	7.90	6.58		6.34	7.40	11.89	6.79	6.50	7.79
Detroit	6.38	7.29	8.27	6.69	7.36	6.56	7.60	11.92	6.90	6.80	7.80
Erie, Pa.	6.19	7.13	9.01	6.54		6.28	7.65		6.56	6.50	7.79
Houston	7.15	7.60	9.40	7.45	9.30	7.15	9.30		7.35	7.20	8.55
Jersey City, N.J.	6.54	7.45	8.42	6.82		6.75	8.43§	11.84	6.50	6.67	8.01
Los Angeles	7.25	9.00	9.35	7.55	11.20	7.15	9.10	13.05	7.35	7.20	9.25
Milwaukee	6.35	7.29	8.17	6.59		6.45	7.57	11.92	6.63	6.50	7.63
Moline, Ill.	6.53	7.47	8.35	6.77		6.63	7.65		6.81	6.68	
New York	6.54	7.45	8.42	6.82		6.75	8.43§	11.84	6.50	6.67	8.01
Newark, N. J.	6.78	7.75	8.42	7.16		7.06	8.43§		6.90	6.99	8.30
Norfolk, Va.	6.90			7.20		7.20	8.50		7.20	7.15	7.85
Philadelphia	6.17	7.13	7.91	7.02	8.80	6.87	8.19§	11.89	6.67	6.63	7.65
Pittsburgh	6.18	7.12	8.00	6.55		6.28	7.65	11.89	6.46	6.33	7.46
Portland, Oreg.	8.15	8.70	9.40	7.90		7.60	10.65		7.50	7.55	9.40
Richmond, Va.	6.50	7.45	8.00	7.10		7.05	7.95		7.10	6.85	8.10
St. Louis	6.48	7.42	8.30	6.72		6.58	7.70	12.05	6.86	6.73	7.86
St. Paul	6.84	7.78	8.66	7.08		6.94	8.06		7.12	6.99	8.12
San Francisco	7.35	8.70	10.15	7.60		7.15	9.75	13.05	7.25	7.20	9.25
Seattle	8.15	9.50	9.80	8.00		7.60	10.65	13.50	7.50	7.60	9.40
Spokane	8.15	9.40¶	9.80	7.60		7.60	10.55§	14.15	7.25	7.35	9.80
Washington	6.71	8.15	8.35	7.51		7.37	8.43		7.49	7.36	8.49

*Prices do not include gage extras; † prices include gage and coating extras, except Birmingham (coating extra excluded); and Los Angeles (gage extras excluded); ‡ includes 35-cent special bar quality extra; § as rolled; †† as annealed. Base quantities, 2000 to 9999 lb except as noted: Cold-rolled strip, and cold finished bars, 2000 lb and over, except in Seattle where base is 2000 to 9999 lb and in Erie where base is 1000 lb and over; ‖—500 to 9999 lb; ¶—1000 to 1999 lb; #—1000 lb and over; ††—1500 lb to 3999; ‡‡—under ½ in.

Warehouse Stocks Well Replenished

Only wide flange beams remain tight in most districts, due to improved shipments from mills and slight curtailment in demand from consumers. Price tone is firm

Boston Warehouse volume is approximately 10 per cent below that of the previous quarter. Cold-rolled sheet sales are holding well, but are in smaller lots, with inventories mounting. Mill shipments have improved to the point most distributors are now operating on a month-to-month procurement policy. Few are writing up orders for the full quarter.

Higher nickel stainless orders for early next quarter are slightly up as stocks of straight chromium stainless with warehouses and consumers are being worked off. In numerous instances stocks of the 400 series were larger than estimated.

At warehouse level, sales and price are now leading factors rather than availability, although the wide flange beams are scarce.

Pittsburgh Sales are at a low point for the second half of the year. Most purchases are spot orders. Distributors expect a pickup late in first quarter. Most warehouses are well stocked. Wide flange beams are still tight, but plate is easing. Structural shapes should be easier to obtain late in January.

Cincinnati The holiday lull is more severe than was expected. Sales are spotty. Warehouse inventories continue to rise.

Philadelphia On a dollar basis, leading distributors here expect sales this year to run ahead of last year, reflecting price advances this summer which are helping to offset the lag tonnagewise. However, even tonnagewise, business this year will be good, and while demand may be off again next year, most warehouses look for a reasonably satisfactory volume.

Cleveland Yearend influences are noticeably restricting demand on district warehouses. With holiday manufacturing operations suspensions projected on a wider scale than in recent years expectations are order volume will decline further. Pickup is anticipated next month but most operators think volume will be down from a year ago. Current stock position of the distributors is greatly improved as compared with this time last year.

St. Louis Warehouse steel business is off 15 to 20 per cent from

STEEL IMPORT PRICES

(Base, per 100 lb, landed, duty paid)

	North Atlantic	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A-305	$4.65	$4.75	$4.65	$4.90
Bar Size Angles	4.30	4.40	4.30	4.58
Structural Angles	4.30	4.40	4.30	4.58
I-Beams	4.30	4.40	4.30	4.58
Wide Flange Beams	4.94	5.02	4.94	5.22
Sheet and Plate, 10 gage, 11 gage, 5' x 10'	5.87	5.95	5.87	6.25
Furring Channels, C.R., 1000 ft, ¾ x 0.30 lb per ft	25.00	25.70	25.50	26.34
Barbed Wire	6.20	6.30	6.20	6.48
Merchant Bars	4.55	4.65	4.55	4.83
Hot Rolled Bands	4.65	4.75	4.65	4.93
Wire Rods, Thomas Commercial No. 5	4.68	4.75	4.73	5.00
Wire Rods, O-H, Cold Heading Quality No. 5	5.14	5.21	5.19	5.46
Channels	4.40	4.50	4.40	4.68
Bright Common Wire Nails, 8d	6.55	6.65	6.60	6.85

Size O.D.	Wgt/Foot/Lb	Gulf Port	West Coast	Vancouver
Seamless A.P.I. Casing, Grade J-55:				
5½ in.	15.5	$1.47/ft	$1.51/ft	$1.32/ft
7 in.	23	2.10/ft	2.17/ft	1.90/ft
Seamless N-80 Casing:				
5½ in.	17	1.94/ft	2.00/ft	1.75/ft
7 in.	23	2.50/ft	2.70/ft	2.36/ft
Seamless J-55 Tubing:				
2⅜ in.	4.7	0.60/ft	0.63/ft	0.55/ft
2⅞ in.	6.5	0.80/ft	0.83/ft	0.73/ft

Sources of shipment: Western continental European (Schuman Plan) countries.

the average of 1953's first nine months, with inventories 110 per cent tonnagewise of that average. With possible exception of wide flange beams, all warehouse items are plentiful.

Notable weakness has developed in production shearing operations. Consumers are watching their stocks and attempting to liquidate them. Reports are heard some overstocked fabricators are offering surplus inventories at cut prices. Dealers doubt the widely-predicted January pickup will materialize.

Los Angeles—Seasonal influences keep the lid on warehouse steel sales. Distributors are building stocks of structural shapes and flat-rolled items but are refusing tonnage on such as reinforcing bars.

Seattle—Warehouse prices are firm. Business is seasonally slack but a good volume of orders is promised for first quarter. With inventories rapidly approaching normal, distributors are in improved position to serve the trade in the face of sharply increased competition.

San Francisco—Except for plates and structurals, warehouses have well rounded inventories. Their problem is to keep stocks of some items from getting top-heavy. Business in recent weeks has been spotty, but volume is contrasting favorably with the seasonal experiences of other years.

Semifinished Steel . . .

Semifinished Prices, Page 126

Chicago—In seven weeks the steelmaking rate in this district has dropped progressively from 100.5 to 94 per cent of capacity in the week ending Dec. 19. One year ago operations were 111 per cent. Curiously, but because Chicago capacity this year is over 2.5 million tons larger than in 1952, actual production at present is only a shade below that of a year ago.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 126

Chicago—Propitious for reinforcing steel demand next year is the $84.5 million road building program scheduled by the state of Illinois. This will include 160 miles of new roadway. In the road program there are 71 new bridges, widening of 37 others and construction of 20 grade separations.

Seattle—Rolling mill production will be down sharply this month due to holiday suspensions and shutdowns for repairs. Northwest Steel Rolling Mills Inc., will be idle from Dec. 18 over the yearend.

January Sheet Buying Spurt Seen

Producers confident of substantial pickup in ordering next month. Current market sluggishness intensified by approach of yearend holidays. Active first quarter expected

Sheet and Strip Prices, Page 126 & 127

Boston—Downward revisions in cold strip prices are not uniform. Heaviest impact, temporarily at least, is the 5.90c posted by the New Haven, Conn., producer. If equalized, normal differentials over outside mills are weakened by additional competitive tonnage. Low carbon and up to 0.41-0.60 carbon are involved.

Prompt delivery is specified for most current strip buying and there are some openings for January. Converters are buying only spot grades currently short, holding back orders beyond next month.

Generally, only silicon grades of strip, sheets and a limited number of specialties are booked into February.

Large offerings of cold-rolled carbon sheets are out without prying loose much new volume.

Philadelphia—Despite sluggish demand for sheets, base prices continue unchanged. Undertone actually appears a little firmer than recently when requests for cancellations and deferments were more numerous. At present there is little in the way of either, and the feeling among producers is that excess consumer inventories will be worked off well before end of next month.

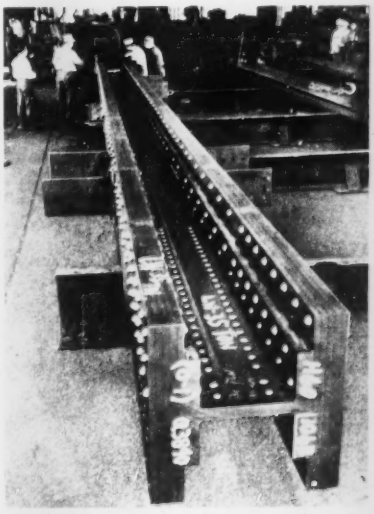
Pittsburgh—Shipments of hot and cold-rolled sheets are strong but incoming orders continue to drop. Pickup in orders from automakers is expected to reverse this trend in first quarter. Electrical sheet sales are fair. Strip sales are poor.

Cleveland—Sheet mill order books are not bulging with business like they were at this time a year ago. First quarter schedules are unfilled with consumers ordering cautiously. With supplies freer they are inclined to buy only against needs, not being so greatly concerned over inventories as in recent years. Despite this apparent consumer apathy producing mills anticipate a spurt in ordering next month.

The 98-inch continuous mill of Republic Steel Corp. here will not be affected by the closing down for repairs of the plant's 44-inch blooming mill from Dec. 20 to Jan. 2. Sufficient semifinished is on hand to keep the mill engaged.

Cincinnati—Stocks are excellent with just about every kind of flat and coiled item available. Mill deliveries are good but demand is off.

Los Angeles—Deferral of large committments has enabled Kaiser Steel Corp. to accept additional new tonnage for first quarter.



Pillar of Strength

This 35-ton column for a Chicago skyscraper is being fabricated by American Bridge Division, U. S. Steel Corp., in its Ambridge, Pa., plant. It is part of the 31,000 tons of structural steel which are required for this building

Structural Shapes . . .

Structural Shape Prices, Page 126

Boston—Flurry in bridge contracts has placed 5000 tons on shop backlogs with more tonnage being estimated. Connecticut is closing on 2000 tons, including a 4-span truss over the Housatonic river. Remaining tonnage is for rolled beam spans, also an 800-ton bridge replacement, Manchester, N. H.

With exception of wide flange beams, plain structurals are in better supply with prices for fabrication-in-transit firm.

New York—Year-end lag in structurals has been cushioned by an inquiry for approximately 25,000 tons for the proposed 41-story Esso Standard Oil building at Lexington Ave. and 42nd St., on which the Turner Construction Co. is general contractor. Also, inquiry has been

in these "watch dogs" of industry...

LEBANON STEEL Castings are at work

SAFETY valves, those "watch dogs" of industry, are particularly important in chemical, refinery and power plants. Farris Safety and Relief Valves, for instance, are "on guard" 24 hours a day, protecting workers, protecting equipment, and assuring uninterrupted plant operations. Lebanon CIRCLE L castings, important parts of these valves, are produced in several special alloys including CIRCLE L-17*, a hardenable, corrosion-resistant, stainless steel with exceptional strength at elevated temperatures. Selecting these Lebanon casting materials added greater reliability to Safety and Relief Valves operating in lines handling steam, corrosive fluids and gases. These Safety and Relief Valves are manufactured by the Farris Engineering Corporation, Palisades Park, N. J.

Lebanon's experienced craftsmen produce castings in a wide range of materials . . . flexibility and control that provide truly dependable products.

*Lebanon's designation for Armco's 17-4-PH, produced under license by Armco Steel Corporation.

See "STEEL WITH A THOUSAND QUALITIES"—37 min., 16 mm. semi-technical, full-color sound film on the making of steel castings. For information write: Dept. B, Lebanon Steel Foundry.

LEBANON Castings

CARBON, SPECIAL ALLOY AND STAINLESS STEEL

LEBANON STEEL FOUNDRY LEBANON, PA.

bolstered by approximately 5500 tons of building construction for the Army Air Base at Plattsburg, N. Y., on which bids open Dec. 22.

Philadelphia—For the first time in many months a slight easing in wide flange beams is noted, but only as it applies to the larger sizes. Standard shape supply continues to soften, reflecting seasonal decline in building and a generally freer supply of steel.

Pittsburgh—Structural mills here have sizable order backlogs. An area mill has converted to production of standard shapes, easing pressure on the principal producer and improving deliveries.

Steel Bars . . .

Bar Prices, Page 126

Boston—Relatively few bar users are writing up first quarter orders beyond January, but volume from direct manufacturing consumers for that month are up slightly. Warehouse distributors are loaded with carbon and alloy bars.

Delivered prices and freight absorption enter into buying to an increasing degree. One of leading steel consumers has queried all suppliers as to their policy in equalizing on lowest delivered price, indicating orders for its various plants will go to the lowest priced delivered shipments. Buffalo and Fairless, Pa., will be the key bases for most New England tonnage. Some Pittsburgh cold-finished tonnage, but not hot-rolled, involves freight absorption.

New York—Hot carbon bar producers can still schedule additional tonnage for January rolling. Some larger sellers can accept most any size or shape for the period. In no case will there be carryovers at end of this year worthy of the name.

Philadelphia—Bar demand may dip further over the holidays, but this should mark the end of the current downward trend. It if weren't for yearend influences, the situation would probably be leveling off now. There are few, if any, cancellations or requests for deferments, and there are definite indications some consumers let their stocks get too low.

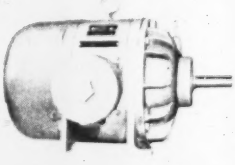
Pittsburgh—Normally slow at yearend, bar sales are further slowed by consumer inventory accumulations. Sales to appliance and automakers have not yet responded to renewed selling efforts.

Cleveland—Sluggishness prevails in the bar market and not much change in demand conditions is anticipated until after the holidays. Bookings for first quarter have been disappointing so far. However, the

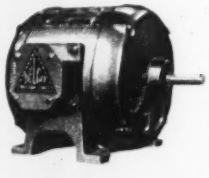
DEPENDABILITY...

that minimizes costs

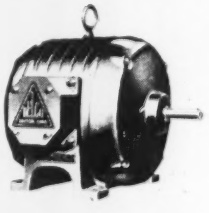
Delco Motors



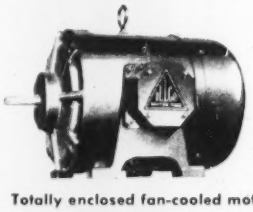
Explosion-proof motor



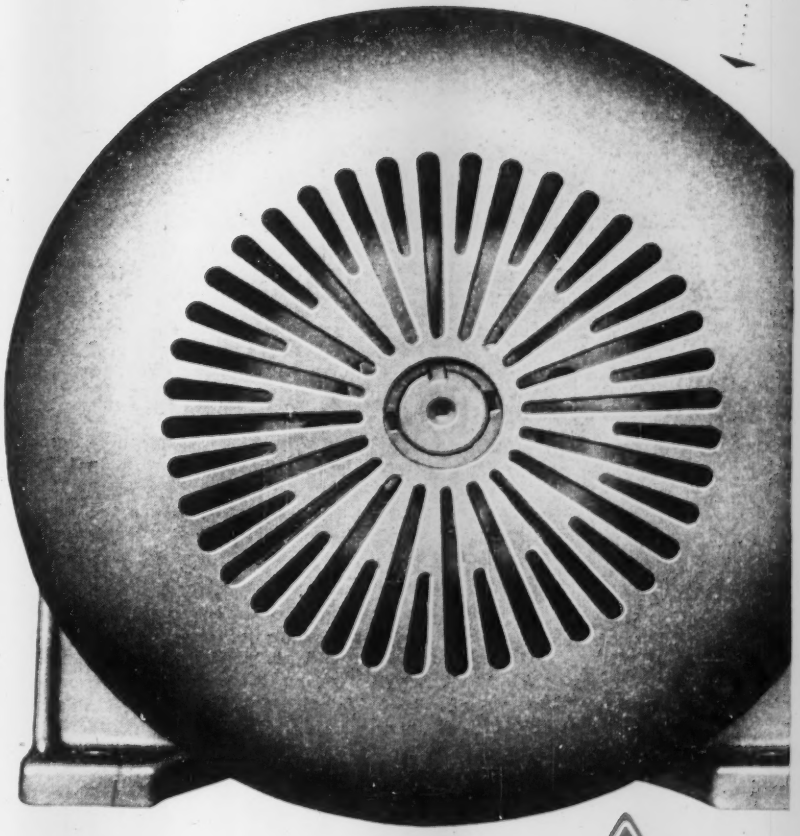
Open ball-bearing motor



Totally enclosed ball-bearing motor



Totally enclosed fan-cooled motor



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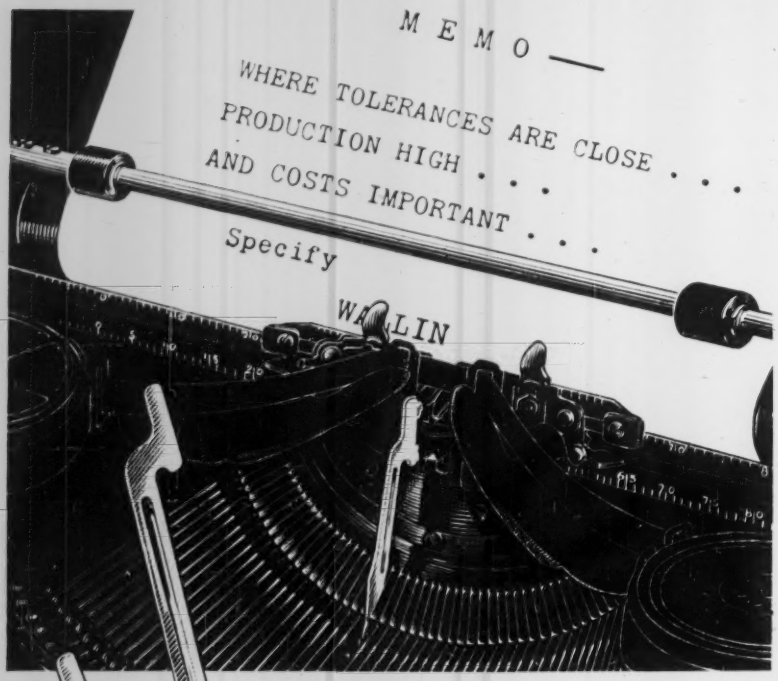

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WALLINGFORD, CONN., U.S.A.

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mills anticipate a spurt in buying next month, principally on the part of automotive interests.

Republic Steel Corp.'s bar mill here will be closed down for a brief but indefinite time beginning this week because of repairs to the plant's 44-inch blooming mill between Dec. 20 and Jan. 2.

Cincinnati—Both alloy and carbon bars are in plentiful supply. Business is better in carbon than alloy bars.

Tubular Goods . . .

Tubular Goods Prices, Page 129

Pittsburgh—Short lead time allowed by consumers makes predictions difficult for next year. Customers are asking virtually immediate delivery on all but seamless tubing for oil country use.

Boston—Distributors and consumers of merchant steel pipe and other tubular products are not buying. Books are being opened for February after a rather sorry showing in January. The leading district pipe fabricator, procurement center for nation-wide branch shops, indicates February purchases will be at minimum, no tonnage for some branches.

This stagnation is accompanied by soft prices in buttweld pipe and light-wall electric tubing. Most interest is in seamless, 5 to 10-inch.

Plates . . .

Plate Prices, Page 126

Philadelphia—Plate consumers will likely start building up inventories once the new year gets under way. But specifications for January will be under the average of recent months.

Mill operations during the holidays will be at low ebb.

Lukens Steel Co. will accept bids in January on an armor plate heat-treating building 1000 feet long and more than 100 feet wide. This will represent the major phase of a $10,500,000 program to be carried out for the Navy. The proposed building, in addition to housing continuous heat-treating furnaces, will also have two cold plate roller levelers and a 5000-ton press among other items of armor plate producing equipment.

Boston—While plate demand is off January schedules are filling slowly. There is minimum freight absorption. One leading mill has 75 to 85 cents per ton advantage over several Pennsylvania mills with small premiums, while most Pittsburgh tonnage approximates $2.35 a ton higher, delivered Boston. Intermixed are smaller f.o.b. mill price premiums at several points. There are multiple prices, but

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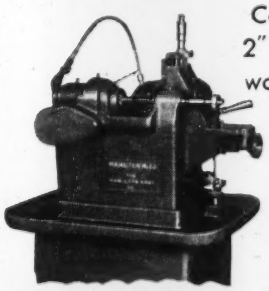
HAMILTON No. 00

For the generation of spur gears and pinions only.

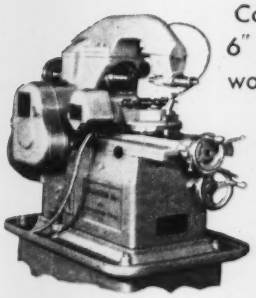
Capacity: 2" O.D. of workpiece.



HAMILTON No. 1

Hobs spur and spiral gears, worm gears and worms (to three thread), splined shafts, gear sectors, and pinions.

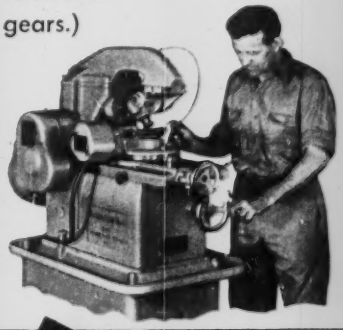
Capacity: 6" O.D. of workpiece.



HAMILTON No. 1-B

Generates any shape that can be made on the No. 00 or the No. 1 machines, *plus* bevel gears and face gears.

Capacity: 6" O.D. of workpiece (3" O.D. by 3/16" face, for bevel gears.)



Exclusive Greater range of hob spindle speeds: 109 to 1259 R.P.M. — 12 speeds.

Exclusive Speed, feed, indexing. *Each can be selected independently.* This, and wide range of hob speeds, adds flexibility; reduces set-up time; gives quick selection of speed and feed to suit material and gear size.

Exclusive Alignment and trueness of work and hob spindles are held to within .0002".

Exclusive Generates gears from 3 teeth to 1200 teeth.

Exclusive Accumulative error of not more than .0002"

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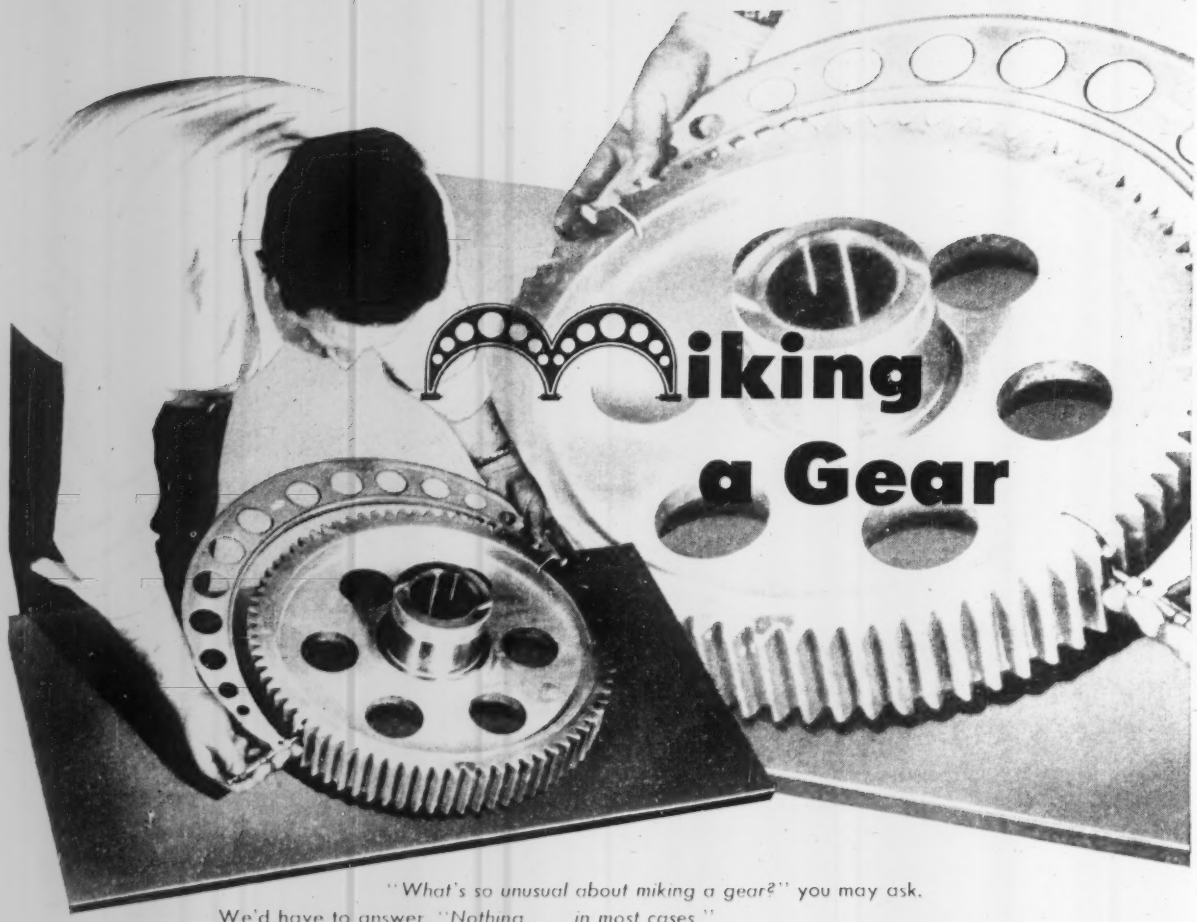

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"What's so unusual about miking a gear?" you may ask.
We'd have to answer, *"Nothing . . . in most cases."*

• But when we talk about miking the pitch diameter over wires, of a big case hardened spur gear which must have a Rockwell hardness of 60, and be held to a very close tolerance, we get down to the finer art of gear making.

• BRAD FOOTE has made tens of thousands of the gear illustrated above, on a long contract run. They are subject to rigid customer inspections, and the percentage of acceptance is exceptionally high. Because of few rejections, production costs are lower. So are the costs to the customer.

• Making gears today is no ordinary job. It's a highly specialized business with new techniques that far outdistance methods used only yesterday. Many of these techniques leave no mark visible to the eye when the gear is first examined. But as the service life increases, the value of modern methods becomes apparent.

• Here at BRAD FOOTE we employ every new technique and modern method that has been proved to increase the life of the widely diversified gears, gearmotors, reducers, and transmissions which we design and manufacture. That's why you can order from us with confidence that our products will serve well in your shop or plants, or on the equipment you make for others.

• Avail yourself of the complete facilities and services offered only by BRAD FOOTE. Send your specifications for quotations, or tell us about the job and let us design what you need.

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PITTSBURGH GEAR COMPANY
Phone: ATlantic 1-9950
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spreads are not now wide enough to warrant much equalization. Last premium price on floor plates has disappeared and mills are not absorbing freight on that product.

New York—Plate mills carryover at end of this month will be small. Up to the present time they have not booked enough new tonnage to fully absorb January schedules.

Pittsburgh—Consumers can secure all the plates they need, although deliveries of some light sizes are slow. Demand is steady at a level below that of last month.

Seattle—Sizable tonnages of plates are involved in construction projects at the Hanford Works but details are classified.

Pig Iron . . .

Pig Iron Prices, Page 130

Cleveland—Sluggishness in the merchant pig iron market is accentuated by seasonal influences. Iron is moving on contract but with the holidays at hand little new buying is developing at the moment and sellers do not look for much in the way of new business before next month. Holiday suspensions and curtailments will be more in evidence this year than for a long time past. Pig iron supplies are adequate for all current needs and the foundries are disinclined to carry heavy inventories with tonnage available on relatively short notice.

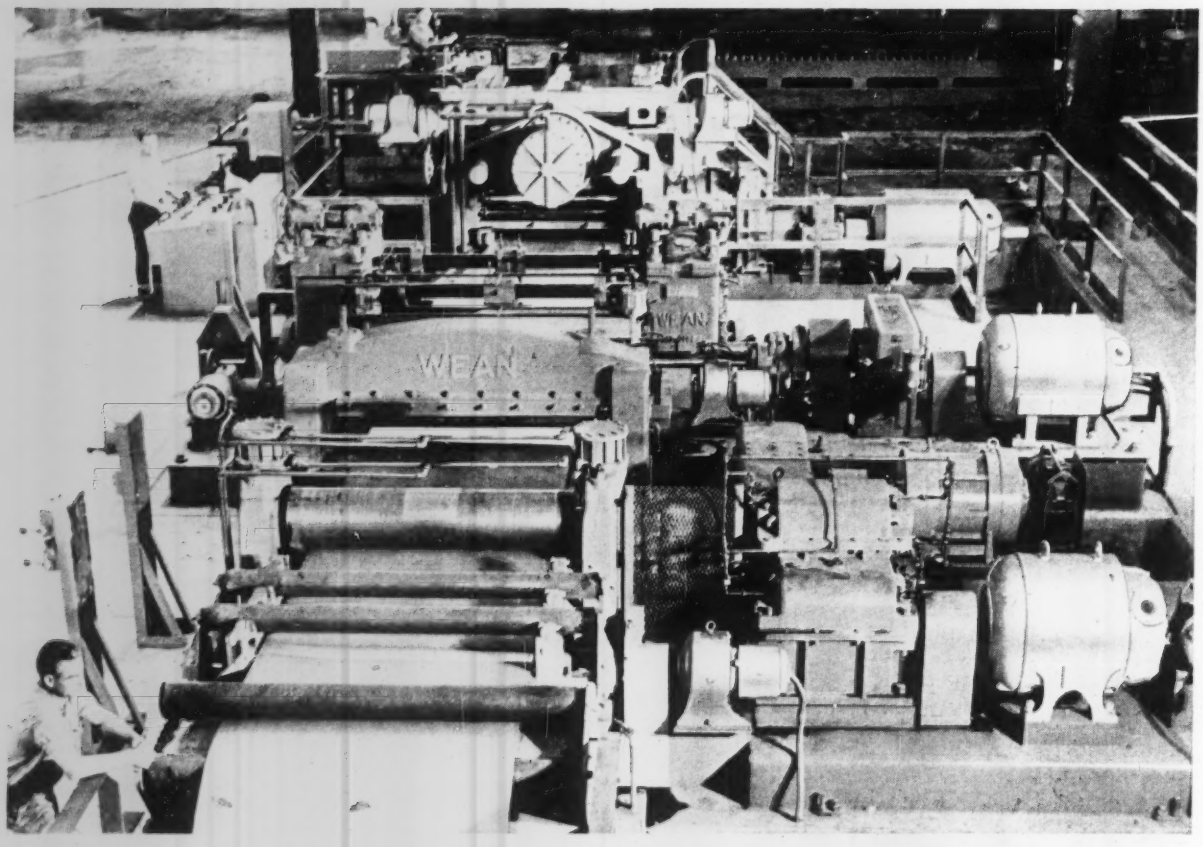
Boston—Shipments this month will barely balance those in November, a slow month in pig iron. Competition for orders is sharper, notably in marginal areas where New York state iron is offered.

With exception of two or three textile equipment builders, foundry inventories are low and any material improvement in demand for castings would soon be reflected in pig iron buying.

New York—With the holidays at hand, movement of pig iron the next two weeks may drop to the lowest level of the year. Some foundries are planning to close down for at least a week. Return to pre-holiday levels should be reached early in January, with perhaps a slow but further improvement after that.

The Troy, N. Y., blast furnace of Republic Steel Corp. has resumed production of low phos pig iron following several weeks suspension for relining.

Buffalo—Pig iron production holds at 78 per cent of capacity here. More than 80 per cent of output is going into ingot production. Foundry operations are spotty. Increasing iron



ANOTHER HIGH-PRODUCTION PROCESSING LINE WITH RELIANCE HEAVY-DUTY MOTORS

This continuous pickling line at Pittsburgh Steel's new Allenport mill is one of the most modern in the industry. Pittsburgh Steel and its equipment suppliers chose Reliance Motors, both a-c. and d-c., totaling some 2500 hp. These drives employ Reliance motor-generator sets, and Reliance rotating (VSA) regulators for voltage (speed) control of the line. Current-limit accelerating and decelerating controls on the entry and delivery sections keep the center or processing section in continuous operation at the maximum speed consistent with top-quality production.

Choice of Reliance at Pittsburgh Steel follows logically from the outstanding performance and dependability record of Reliance drives on 80% of all pickling lines in the industry.

In your application, too! The diversity of processing lines in the iron and steel and nonferrous metals industries driven by Reliance Motors explains why long-time users have come to regard them as unsurpassed in dependability. Installations include the fastest continuous pipe mill in the world . . . the biggest seamless tube mill ever built . . . one of the most modern brass mills in operation today . . . the world's widest aluminum strip mill.

To get the right combination of dependable equipment . . . plus skillful application . . . in *your* application, call on Reliance. A call to your nearby Reliance Sales Office . . . or a letter to us direct . . . will place at your disposal nearly 50 years of specialized experience in the application of electric drives. A-1471

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tonnage is moving to the eastern seaboard.

Philadelphia—With various foundries going down for the holiday week, pig iron shipments will reach a new low for the year. After the holidays the trend should be steadily upward, possibly reaching a peak for first quarter in late February or early March. Basic iron, as well as foundry and malleable grades, is in free supply.

Pittsburgh—Weirton Steel Co., Weirton, W. Va., planned to have its No. 1 blast furnace in operation Dec. 17, following a complete reline. New brick lining was installed in three stoves and a partial lining in another.

Chicago—Shipments of pig iron to foundries in December will be somewhat less than in November. Until there is better order volume for castings, little pickup is foreseen. There is some belief farm implement activity may improve in late first quarter.

Los Angeles—Foundry activity is down about 10 per cent due to easing of casting requirements from housing and agricultural industries.

Metallurgical Coke . . .

Metallurgical Coke Prices, Page 149

Chicago—Coke shipments to foundries this month are holding close to those in November. Consumer stocks are adequate. Relatively few jobbing foundries are operating a full work week.

Ferroalloys . . .

Ferroalloy Prices, Page 146

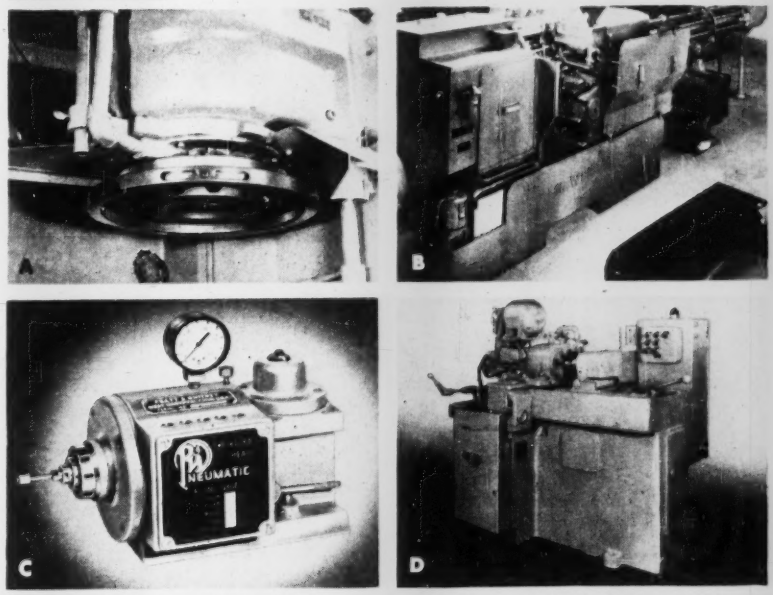
Washington—Production of silicon alloys in the United States during third quarter this year was 5 per cent greater than in second quarter, and exceeded the high level attained at the end of 1952, reports the Bureau of Mines. Shipments and apparent consumption, however, declined.

Total production of silicon alloys in third quarter amounted to 227,442 net tons, comparing with 217,731 in the second quarter. Shipments in the period totaled 203,184 tons against 223,540 in the second three months of the year.

All of the imports during third quarter came from Canada and amounted to 4238 short tons, containing 725 tons of silicon, valued at $258,636. Exports, which totaled 452 short tons, valued at $94,217, increased a little over the second quarter, but remained well below the 1952 average. Mexico, Argentina and Cuba received the bulk of shipments.

METALS

(Advertisement)



Berylco beryllium copper plays a vital role in many production tools. As, for instance, in the: (a) Blanchard Surface Grinder; (b) New Britain Gridley 6-Spindle Automatic Screw Machine; (c) Pratt & Whitney Pneumatic High-Speed Grinding Head; (d) Chucking Grinder. For parts used, see below.

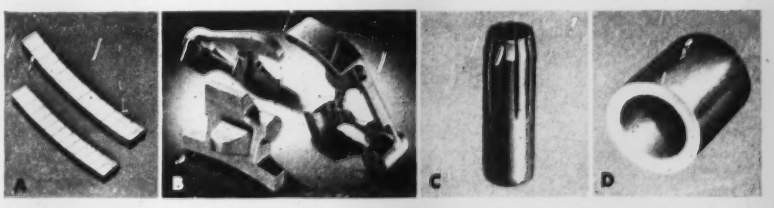
BERYLLIUM COPPER . . . a miracle metal with down-to-earth capacities

The miraculous quality of Beryllium copper is its versatility. Here, in one alloy, are combined such properties as strength, conductivity, elasticity and fatigue resistance. Ask makers of production tools why they choose Berylco. You'll get dozens of reasons. Economy. Ease of production. Hardenability, etc., etc. But it is the capacity of Berylco to make a better product—one that delivers long life with minimum maintenance—that is its outstanding appeal.

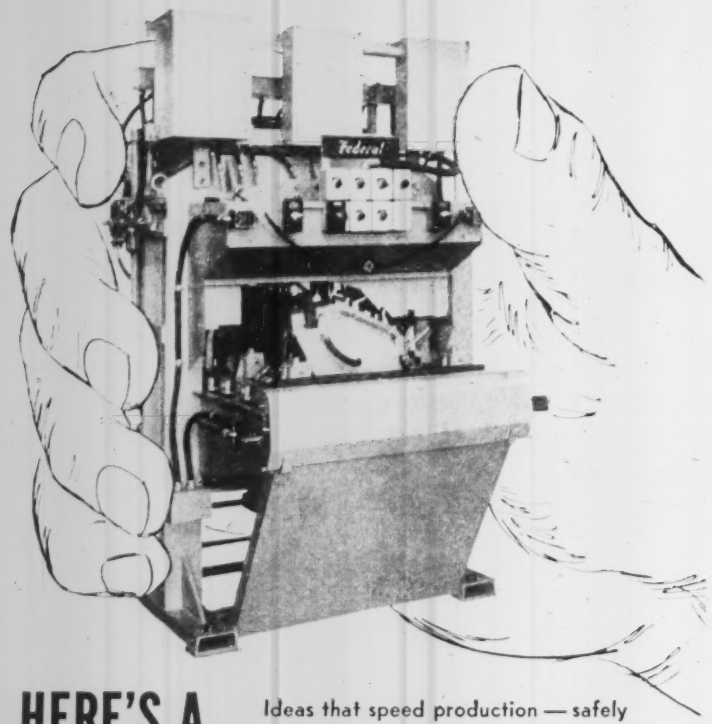
In the automatic screw machine shown above, wear and expensive maintenance in the stock feeding mechanism was eliminated by replacing the offending parts with smaller, more efficient ones made of Berylco. In the chucking grinder, where this alloy is used for "plain" bearings in the cam follower rolls, the dense surface structure of Berylco makes possible an extremely accurate, frictionless bearing. The spring properties of Berylco are all important in the Pratt & Whitney grinding head, where it is used for a spring governor; and in the Blanchard, where it is used for wheel clamps. Because Berylco is corrosion resistant, these clamps do not have to be plated. The nonmagnetic properties of Berylco also eliminate sticking.

One of the best things about Berylco beryllium copper is its availability in any quantity or form you need. If you would like to find out what this unique alloy can do for you, write the world's largest producer of beryllium copper, THE BERYLLIUM CORPORATION, Dept. 3L, Reading 19, Pennsylvania.

Tomorrow's products are planned today—with Berylco beryllium copper

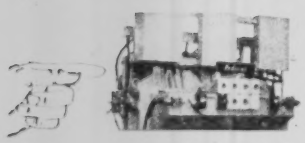


(a) Berylco spring clamps used in the solid wheel holder of a Blanchard Surface Grinder; (b) A few of the Berylco castings in the stock-feeding mechanism of the New Britain Automatic; (c) Berylco spring governor used in the Pratt & Whitney Pneumatic High-Speed Grinding Head; (d) Berylco bearings found in the cam follower rolls of the Chucking Grinder.

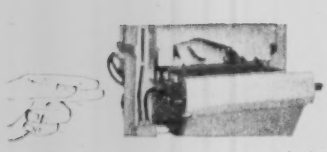


HERE'S A WELDERFULL OF IDEAS

Ideas that speed production — safely —at less cost. Here's resistance welding machine design at its finest. Compact — readily installed — accessible for maintenance — safe and easy to operate — fully automatic. Just a few of the features that make Federal machines first in resistance welding.



All electrical connections readily accessible and compactly arranged in their enclosures for transformer primary leads, electrical accessories terminal board and a "quick disconnect" terminal board for the main control panel. Centralized control station with safety spaced dual start buttons. Emergency cord for instant stopping of machine.



Flash guard moves down to seal off weld area protecting operator and machine. Flexible curtain unrolls with fixture travel to shield slide ways. Body bumper emergency stop. Leg area shield protection.

Booted gun piston rods hardened and ground and equipped with scrapers to avoid weld flash pick-up. Capped electrodes. Guided piston rods for offset loads. Double acting hydraulic gun cylinders. Air and water hose to fixture kept clear of work area.

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Scrap . . .

Scrap Prices, Page 152

New York—Scrap buying is at a virtual standstill with prices on steel grades nominally lower. Some trade leaders see little activity over remainder of this year and no marked improvement during early January. However, others are confident the market will become livelier after turn of the year.

Brokers' buying prices, purely nominal, are $23 to $24 for No. 1 heavy melting and No. 1 bundles, $18.50 to $19 for No. 2 heavy melting, $16.50 to $17.50 for No. 2 bundles, $9 to $10 for machine shop turnings, $12 to $13 for mixed borings and short turnings, $25 to $26 for low phos structural and plate, and $13 to $14 for short shovel turnings.

Weakness prevails in stainless steel scrap with 18-8 sheets, clips and solids now $160 to $165, 430 and 410 sheets, clips and solids holding at $75 to $80 and $65 to $70 respectively. No change is reported, however, in 18-8 borings and turnings, which are $85 to $90.

Boston—Steel scrap prices have dipped to the low levels prevalent earlier this year and far below the post-control peak. All grades are involved, with No. 1 busheling barely holding at $18, shipping point.

Ample inventories and fluctuating district ingot operations, averaging 10 points under the national average, hold down buying by district consumers, while high freights operate against outside purchases.

Buffalo—Except for small sales of cast grades, the scrap market here is at a standstill with prices on steelmaking and blast furnace grades off another $1 per ton. Leading mills are heavily loaded with reserve stocks. Dealer sentiment is at low ebb as yard supplies increase.

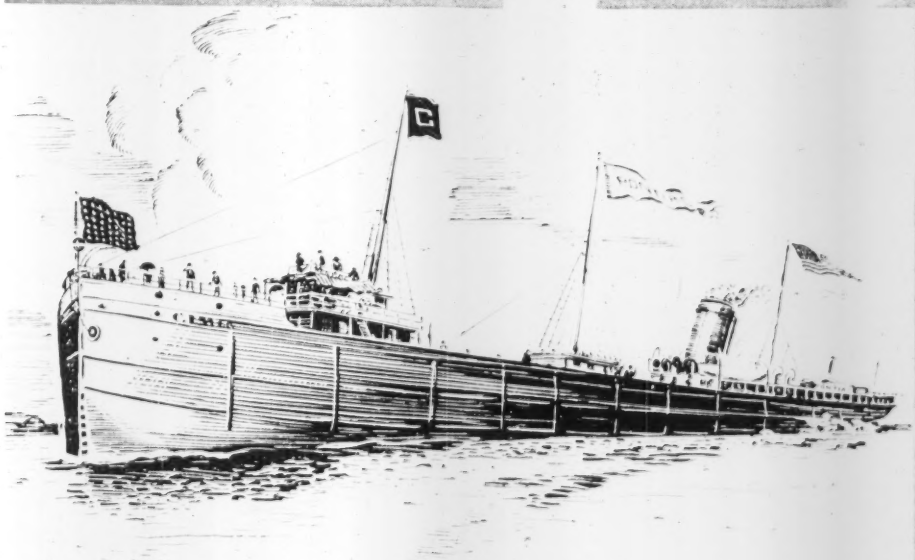
Pittsburgh—Closing of the latest railroad scrap list brought reduced prices for all grades. No. 1 railroad heavy melting dropped $5 to $34 to $35. Other grades fell from $3 to $4.

Cleveland—Based on a sale of 5000 tons of electric furnace grades the scrap market here and in the Valley is off $1 to $3 per ton. Prices, however, are largely nominal with relatively little material moving to the mills and foundries as the holidays approach. Mill operations curtailments over the holiday period will be more extensive than for some years past. Curtailment by the leading local mill will extend from Dec. 20 to Jan. 2.

Little activity is expected in scrap over remainder of the year and the

FIRST

WITH THE STEEL ORE CARRIERS ON THE GREAT LAKES



In 1888 The Cleveland-Cliffs Iron Company built the first steel steamers for the iron ore trade, naming them the Pontiac and Frontenac. They each had a carrying capacity of 2800 tons, and the drawing above is an authentic illustration of them. From this beginning the fleet has increased to meet the growing needs of this company and today the Cleveland-Cliffs fleet numbers 19 ships. The Edward B. Greene is the flagship of the present fleet with an ore capacity of 19,700 tons.

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possibility is seen of distress lots appearing on the market at bargain prices as dealers and brokers seek a home for their accumulations.

Philadelphia With demand sluggish, steel scrap prices have again undergone a substantial decline. No. 1 heavy melting steel, No. 1 bundles and No. 1 busheling have dropped to $31, delivered, and No. 2 heavy melting to $28.

Only two mills are showing any particular interest and even they are taking in tonnage on a limited basis. The Conshohocken, Pa., mill is taking in most of its tonnage by truck and at prices $1 below the delivered rail price.

Detroit Price changes this week are nominal reflecting the undercurrent of pessimism permeating the scrap market here in the absence of sales. Observers look for little firming until after turn of the year in the light of high inventories.

Cincinnati No. 1 railroad heavy melting and malleable dropped $1 and $1 a ton, respectively, as buying resumed in these items in this area. All other prices remain nominal.

Chicago A combination of factors, principally a declining steelmaking rate, continues to depress prices of important open-hearth grades of scrap. Railroad items also are available at lower figures. The decreases range from $1 a ton on No. 1 heavy melting steel to $4 on rerolling rails.

St. Louis Scrap prices continue to weaken. Machine shop and short shovel turnings, normally active here, were marked down $1 in the wake of slumping demand. Melting steel quotes remained at $26, but 3-foot lengths of No. 2 will be marked up to $28 when new specifications are effective Jan. 1.

San Francisco Steel scrap is moving slowly. Dealers' yard stocks are building up moderately.

Wire . . .

Wire Prices, Page 128

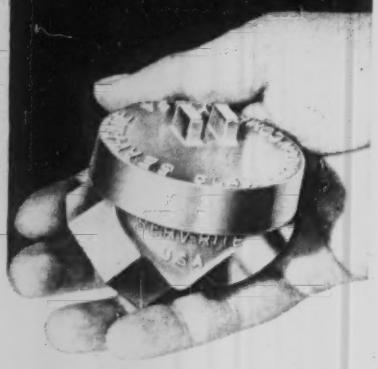
Boston While talking big for first half production, the automobile industry is not backing up its prognostications with steel orders. More wire tonnage is on books for January, but buying beyond that month lags.

There are wide openings in January mill schedules and some finishing departments will operate well below capacity that month.

For some time several producers of stitching wire have been on a

(*Please Turn to Page* 150)

"SERV-RITE" THERMOCOUPLE HEAD



the head that's ahead in every way . . .

This new "Serv-Rite" thermocouple head is actually small enough to be held comfortably in the palm of your hand. But size is only one of the many features that make this thermocouple head really extraordinary. It is loaded with installation and service conveniences that any user of thermocouples will appreciate at once.

The body is of malleable iron, cadmium plated for durability. A new type friction lock assures easy removal or tightening of the cap — a quarter turn does it. An asbestos gasket makes the head dirt and moisture-proof. With a choice of ½", ¾", or 1" IPS opening for the protecting tube, you can standardize on one style head.

The connector block is of a material especially selected to withstand, without damage, temperatures up to 900° F. in continuous service. Improvements over the conventional type of inserts greatly simplify the making of the lead wire connections. The complete thermocouple element, including connector block, can be easily withdrawn for inspection.

Install a "Serv-Rite" thermocouple head and see for yourself how much better it really is.

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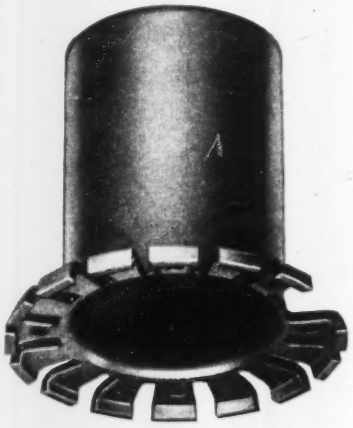

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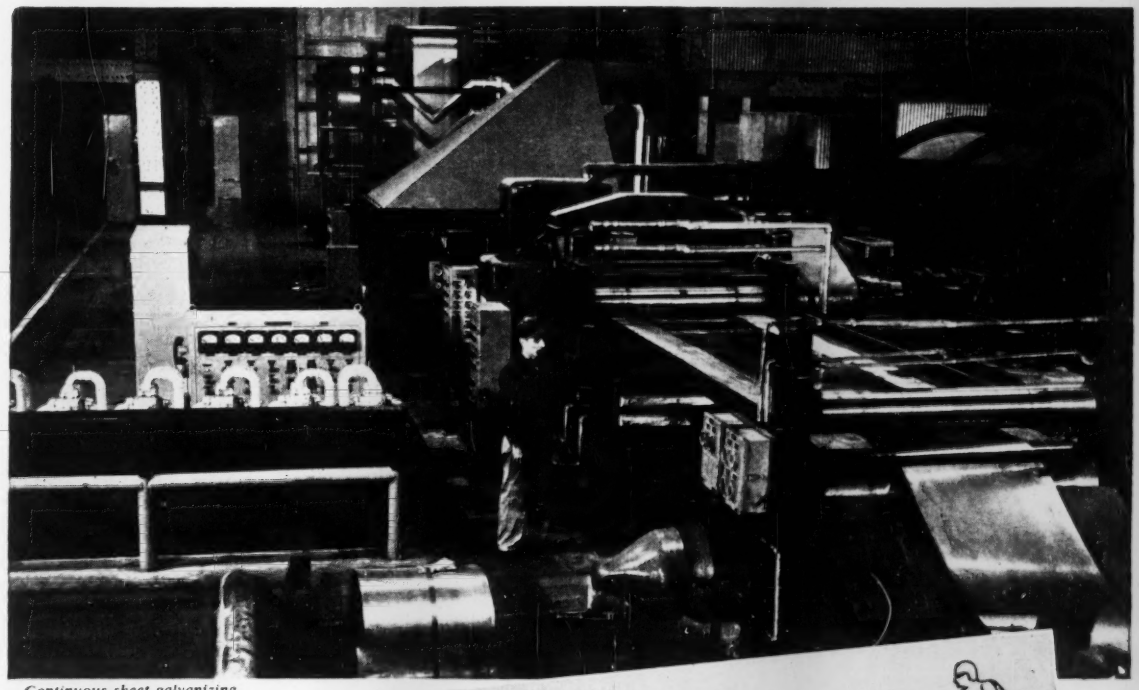

Continuous sheet galvanizing

Over 350,000 tons of Zn annually for "embalming"

ONE OF the most persistent problems confronting the iron and steel industry is the prevention of corrosion; its persistence stems from the fact that we cannot rid ourselves of the agents which effect the corrosion without, at the same time, ridding ourselves of elements – air and water – which are essential to life itself.

Iron does not occur naturally in the metallic state, but only in combination with oxygen and other elements in the form of ore. The smelting of iron is essentially a process for removing the oxygen from the ore by the application of heat; while rusting is, in essence, the reversion of the metal to its natural state by recombination with the oxygen in the air. The rusting process, being electrochemical in character, is actually far more complicated since the moisture and impurities present in the air play a very important part. There is thus a close relationship between the processes connected with the preservation of organic tissue and the prevention of rust. However, while human beings stave off the decaying or "rusting" of their tissues by nutrition, no means have been developed for "feeding" or regenerating iron and, until such time, industry has adapted the ancient Egyptian practice of "embalming."

The most widely used method of "embalming" iron and steel products to prevent their decomposition is by galvanizing, i.e., zinc coating. The fact that, for many years, nearly 50% of all the zinc consumed annually in the United States is used for this purpose, is ample evidence of the firmly established position of the metal as industry's most effective "sacrificial" weapon in its unceasing combat with the ravages of rust.

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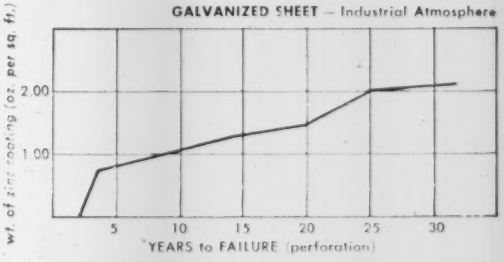
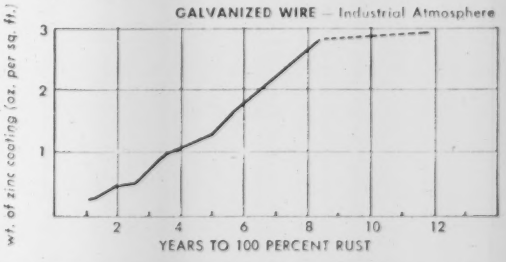


• "The most important factor in determining the lives of zinc coatings in industrial atmospheres is the weight of zinc applied." *from U.S. Bureau of Standards, Circular 7M8*

• The remarkable protective effect of zinc on iron is due to the fact that for electrochemical reasons corroding agents will attack zinc in preference to iron if the two are in contact. Rusting of iron does not occur even at scratches or cut edges of a galvanized coating so long as any zinc remains within about one quarter inch of the exposed iron surface.



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CURRENT FERROALLOY QUOTATIONS

Prices as reported to STEEL

MANGANESE ALLOYS

Spiegeleisen: (19-21% Mn, 1-3% Si). Carlot per gross ton $86, Palmerton, Pa.; $87 Clairton and Duquesne, Pa.
(16 to 19% Mn) $84 per ton, Palmerton, Pa.; $85 per ton, Clairton and Duquesne, Pa.

Standard Ferromanganese: (Mn 74-76%, C 7% approx.) Base price per net ton $200, Clairton, Duquesne, Johnstown and Sheridan, Pa.; Alloy W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; and Portland, Oreg.; add or subtract $2.00 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively.

(Mn 79-81%) Lump $208 per net ton, f.o.b. Anaconda or Great Falls, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

Low Carbon Ferromanganese, Regular Grade: (Mn 85-90%). Carload, lump, bulk, max. 0.07% C, 27.95c per lb of contained Mn, carload packed 28.7c, ton lots 29.8c, less ton 31.0c. Delivered. Deduct 0.5c for max. 0.15% C grade from above prices, 1c for max. 0.30% C, 1.5c for max 0.50% C, and 4.5c for max 75% C max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium Carbon Ferromanganese: (Mn 80-85, C 1.5% max). Carload, lump, bulk 21.35c per lb of contained Mn, carload packed 22.1c, ton lot 23.2c, less ton 24.4c. Delivered. Spot, add 0.25c.

Manganese metal, 2" x D (Mn 95.5% min, Fe 2% max, Si 1% max, C 0.2% max): Carload, lump, bulk, 38.2c per lb of metal; packed, 39.95c; ton lot 38.45c; less ton lots 40.45c. Delivered. Spot, add 2c.

Electromanganese: Carload, 31.5c; ton lots 33.5c; 250 to 1999 lb, 35.5c. Premium for hydrogen-removed metal, 1.5c per pound, f.o.b. cars Knoxville, Tenn. Freight allowed to St. Louis or to any point east of Mississippi.

Silicomanganese: (Mn 65-68%). Contract, lump, bulk, 1.50% C grade, 18-20% Si, 11.4c per lb of alloy, carload packed, 12.15c, ton lots 13.05c, less ton 14.05c. Freight allowed. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. For 3% C grade, Si 12-14.5%, deduct 0.5c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lots 2" x D, $1.50 per lb of contained Ti; less ton $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lots $1.35, less ton $1.37, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $177 per net ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium Carbon: (Ti 17-21%, C 2-4.5%). Contract $195 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

CHROMIUM ALLOYS

High Carbon Ferrochrome: Contract, c.l., lump, bulk 24.75c per lb of contained Cr; c.l. packed 25.65c, ton lot 26.80c, less ton 28.20c. Delivered. Spot, add 0.25c.

Low Carbon Ferrochrome: (Cr 67-72%) Contract, carload, lump, bulk, max. 0.025% C (Simplex) 34.50c per lb contained Cr, 0.03% C 36.50c, 0.04% C 35.50c, 0.06% C 34.50c, 0.10% C 34.00c, 0.15% C 33.75c, 0.20% C 33.50c, 0.50% C 33.25c, 1% C 33.00c, 1.50% C 32.85c, 2% C 32.75c. Carload packed add 1.1c, ton lot 2.2c, less ton add 3.9c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, High Carbon: (Cr 62-66%, C 5-7%) Contract, c.l., S M x D, bulk, 26.25c per lb contained Cr. Packed, c.l. 27.15c, ton 28.50c, less ton 30.25c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, Low Carbon: (Cr 50-54%, Si 28-32%, C 1.25% max). Contract, carload, packed, S M x D, 18.35c per lb of alloy; ton lot 19.2c; less ton lot, 20.4c, delivered; spot, add 0.25c.

Low-Carbon Ferrochrome Silicon: (Cr 34-41%, Si 42-49%, C 0.05% max.) Contract, carload, lump, 4" x down and 2" x down, bulk 25.75c per lb of contained chromium plus 12.4c per pound of contained silicon; 1" x down, bulk 25.90c per pound of contained chromium plus 12.60c per pound of contained silicon. F.o.b. plant; freight allowed to destination.

Ferrochrome Silicon, No. 2: (Cr, 36-39%, Si 26-39%, Al 7-9%, C 0.05% max). 25.75c per lb of contained chrome plus 12.4c per lb of contained silicon plus aluminum 3" x down, delivered.

Chromium Metal: (Min 97% Cr and 1% Fe) contract, 1" x D; packed, max 0.50%, carload $1.12, ton lots $1.14, less ton $1.16. Delivered. Spot, add 5c. Prices on 0.10 per cent carbon grade, add 4c to above prices.

VANADIUM ALLOYS

Ferrovanadium:, Open-hearth Grade (V 35-55%, Si 8-12% max, C 3-3.5% max). Contract, any quantity, $3.00 per lb of contained V. Delivered. Spot, add 10c. **Crucible-Special Grades** (V 35-55%, Si 2-3.5% max, C 0.5-1% max). $3.10. **Primos and High Speed Grades** (V 35-55%, Si 1.50% max, C 0.20% max) $3.20.

Grainal: Vanadium Grainal No. 1, $1 per lb; No. 6, 68c; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lots $1.28 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

25-30% Ferrosilicon: Contract, carload, lump bulk, 20.0c per lb of contained Si, packed 21.40c; ton lot 22.50c, f.o.b. Niagara Falls, freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump bulk, 12.40c per lb of contained Si, carload packed 14.0c, ton lot 15.45c, less ton 17.1c. Delivered. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max.) Add 1.3c to 50% ferrosilicon prices.

75% Ferrosilicon: Contract, carload, lump, bulk, 14.3c per lb of contained Si, carload packed 15.6c, ton lot 16.75c, less ton 18.0c. Delivered. Spot, add 0.8c.

90-95% Ferrosilicon: Contract, carload, lump, bulk, 17.0c per lb of contained Si, carload packed 18.2c, ton lot 19.15c, less ton 20.2c. Delivered. Spot, add 0.25c.

Silicon Metal: (Min 97% Si and 1% max Fe) c.l. lump, bulk, regular 18.5c per lb of Si, c.l. packed 19.7c, ton lot 20.6c, less ton 21.6c. Add 0.5c for max. 0.10% calcium grade. Deduct 0.5c for max 2% Fe grade analyzing min 96% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe) Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 9.90c per lb of alloy, ton lots packed 11.30c, 20 to 1999 lb 11.65c, smaller lots 12.15c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 30-43%, Fe 40-45%, C 0.20% max). Contract, c.l. lump, bulk 8.0c per lb of alloy, c.l. packed 8.75c, ton lot 9.5c, less ton 10.35c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Contract, carload, lump, packed 20.25c per lb of alloy, ton lot 21c, less ton 22.25c. Freight allowed. Spot add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy. Less than 100 lb $1.30. Delivered, spot add 5c. F.o.b. Washington, Pa., prices, 100 lb and over are as follows: Grade A (10-14% B) 85c per pound; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si), $5.25 per lb contained B, delivered to destination.

Bortam: (B 1.5-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 1 to 2%) contract, lump, carloads 9.50c per lb, f.o.b. Suspension Bridge, N. Y. freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Contract, carload, lump, bulk 20.0c per lb of alloy, carload packed 20.8c, ton lot 22.3c, less ton 23.3c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.50-3%). Contract, carload, lump, bulk 19.0c per lb of alloy, carload packed 20.2c, ton lot 22.1c, less ton 23.6c. Deld. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx. 3⅝ lb each and containing exactly 2 lb of Cr). Contract, carload, bulk, 16.25c per lb of briquet, carload packed 16.95c, ton 17.75c, less ton 18.65c. Deld. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing exactly 2 lb of Mn). Contract, carload, bulk 12.45c per lb of briquet, c.l. packaged 13.25c, ton lot 14.05c, less ton 14.95c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing exactly 2 lb of Mn and approx. ½ lb of Si). Contract, c.l. bulk 12.65c, per lb of briquet, c.l. packaged 13.45c, ton lot 14.25c, less ton 15.15c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx. 5 lb and containing exactly 2 lb of Si). Contract, carload, bulk 6.95c per lb of briquet. Packed c.l. 7.75c, ton lot 8.85c, less ton 9.45c. Delivered. Spot, add 0.25c.
(Small size—Weighing approx. 2½ lb and containing exactly 1 lb of Si). Carload, bulk 7.4c. Packed c.l. 7.9c, ton lot 8.7c, less ton 9.6c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each) $1.14 per pound of Mo contained, f.o.b. Langeloth, Pa.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%), 10,000 lb W or more, $4.10 per lb of contained W; 2000 lb W to 10,000 lb W, $4.20; less than 2000 lb W, $4.32, f.o.b. Niagara Falls, N. Y.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 56-60%, Si 8% max, C 0.4% max). Contract, ton lot, 2" x D, $6.40 per lb of contained Cb, less ton $6.45. Delivered. Spot, add 10c.

Ferrotantalum—Columbium: (Cb 40% approx., Ta 20% approx., and Cb and Ta 60% min, C 0.30% max) ton lots, 2" x D, $4.75 per lb of contained Cb plus Ta, deld.; less ton lots $4.80.

Silicaz Alloy: (Si 35-40%, Ca 9-11%, Al 6-8%, Zr 3-5%, Ti 9-11%, B 0.55-0.75%). Carload packed, 1" x D, 45c per lb of alloy, ton lot 47c, less ton 49c. Delivered.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx). Contract, carload, packed, ½" x 12 M, 17.5c per lb of alloy, ton lots 18.25c, less ton 19.5c. Deld. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 17.50c per lb of alloy; ton lots 18.50c; less ton lots 20c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

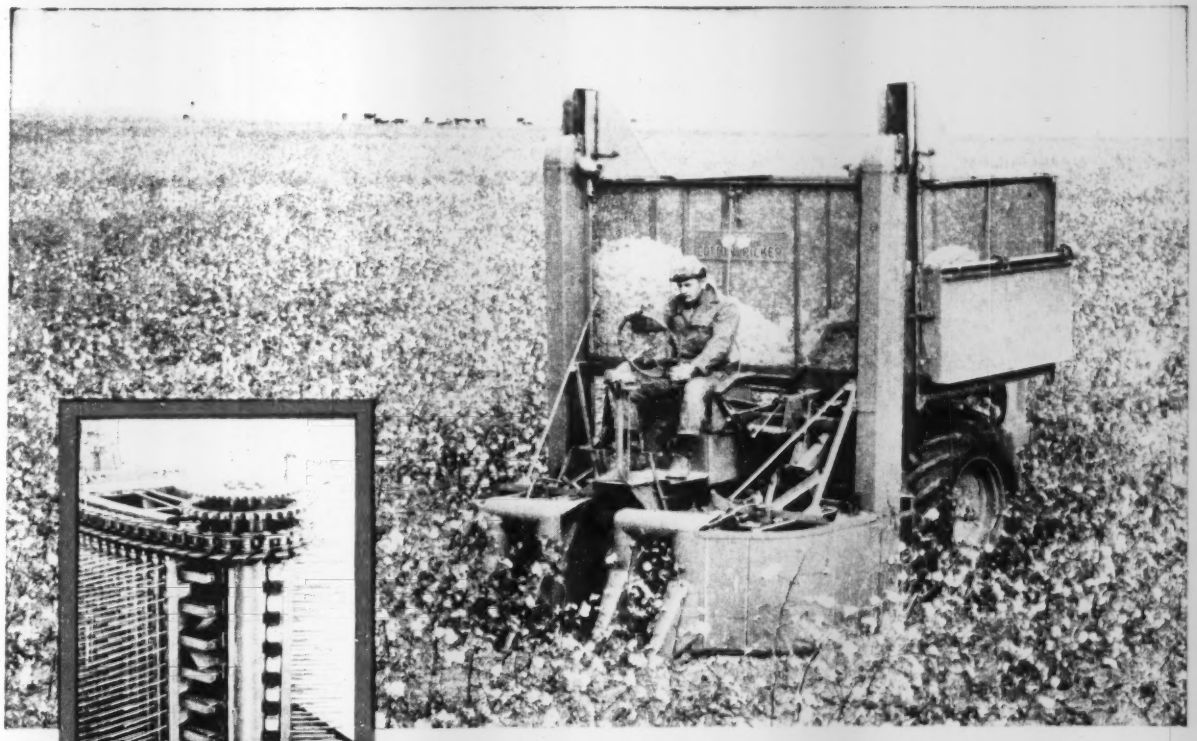
V-S Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 15c per lb of alloy; ton lots 16.50c; less ton lots 17.75c, f.o.b., Niagara Falls; freight allowed to St. Louis.

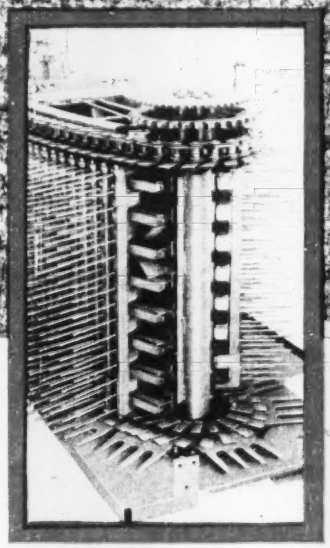
Simanal: (Approx. 20% each Si, Mn, Al; bal. Fe). Lump, carload, bulk 14.50c. Packed c.l. 15.50c, ton lots, 15.75c, less ton lots, 16.25c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $1 for each 1% of P above or below the base); carloads, f.o.b. sellers' works, Mt. Pleasant, Siglo, Tenn., $90 per gross ton.

Ferromolybdenum: (55-75%). Per lb contained Mo, f.o.b. Langeloth, $1.32 in all sizes except powdered which is $1.41; Washington, Pa., furnace, any quantity $1.32.

Technical Molybdic-Oxide: Per lb. contained Mo, f.o.b. Langeloth, Pa., $1.14 in cans; in bags, $1.13, f.o.b. Langeloth, Pa.; Washington, Pa., $1.13.





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A few years back when the new cotton picker was in the design and testing stage, the carbon steel fingers . . all 2,560 of them came up for some serious attention. The heat treating *had* to be right. For the "fingers" had to be straight and they had to be hard. Just the right hardness . . not *too* hard or they might snap off, and not too soft or they might bend.

Allis-Chalmers brought their problem to the metallurgical and heat treating research laboratories of Lindberg Steel Treating Co. In a short time, Lindberg heat treating specialists, in cooperation with Allis-Chalmers engineers, developed an effective and successful process. It permitted the heat treating of the carbon steel fingers without scaling . . and without distortion . . . to precisely the right physical properties.

Solving problems in heat treating is an everyday experience for Lindberg Steel Treating Company. Some 34 metallurgical engineers and metallurgists with a composite heat treating experience of more than 650 years are available to consult with you on any heat treating problem. Your inquiry is invited.

A case history of Lindberg Steel Treating Co. service to American industry

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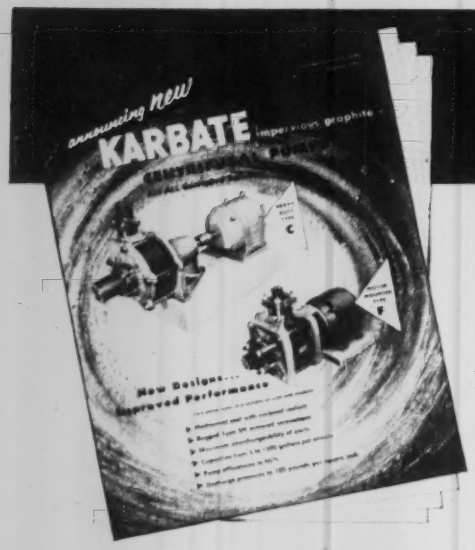

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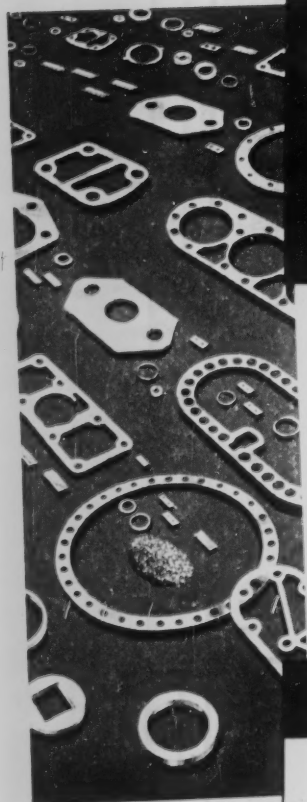

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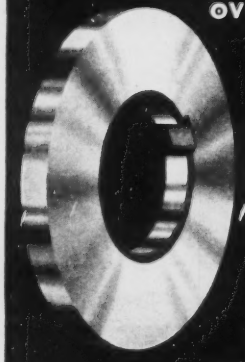

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ORES–COKE–REFRACTORIES

Prices as reported to STEEL; changes shown in italics.

ORES

Lake Superior Iron Ore

(Prices effective July 1, 1953, and thereafter; gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Old range bessemer	$10.30
Old range nonbessemer	10.15
Mesabi bessemer	10.05
Mesabi nonbessemer	9.90
Open-hearth lump	11.15
High phosphorus	9.90

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon which were in effect on June 24, 1953, and increases or decreases after such date are for buyer's account.

Eastern Local Iron Ore

Cents per unit deld. E. Pa.

Foundry and basic 56-62% concentrates, contract	17.00-18.00

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 60 to 68%:	
Spot	nom.
Long-term contract	22.00
North African hematite (spot)	24.00-26.00
Brazilian iron ore, 68-69% (spot)	25.00-26.00

Tungsten Ore

Net ton unit, before duty

Foreign Wolframite, min. 65%, WO_3, good commercial quality	$39-$40
Domestic scheelite, mine	63.00

Manganese Ore

Mn, 48% nearby, $1.18-$1.21 per long ton unit, c.i.f. U. S. ports, duty for buyers' account; shipments against old contracts for 48% ore are being received from some sources at 90-93c.

Chrome Ore

Gross ton, f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., or Tacoma, Wash.:

Indian and African	
48% 2.8:1	$40.00-$42.00
48% 3:1	44.00-46.00
48% no ratio	32.00-34.00
South African Transvaal	
44% no ratio	$27.00-$28.00
48% no ratio	34.00-35.00
Brazilian	
44% 2.5:1 lump	nom. $32
Domestic	
(Rail nearest seller)	
48% 3:1	$39.00

Molybdenum

Sulphide concentrate, per lb, Mb content, mines, unpacked	$1.00

Antimony Ore

Per unit of Sb content, c.i.f. seaboard

50-60%	$2.40-$2.80
65% min.	$3.40-$3.50

Vanadium Ore

Cents per lb. V_2O_5 content, deld. mills

Domestic	31.00

REFRACTORIES

Fire Clay Brick

High-Heat Duty: Pueblo, Colo., $89; Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parral, Portsmouth, O., Ottawa, Ill., Stevens Pottery, Ga., Woodbridge, N. J., $109; Salina, Pa., $114; Niles, O., $120; Los Angeles, Pittsburg, Calif., $132.30.

Silica Brick

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Portsmouth, O., $115; Warren, O., Hays, Pa., $120; Niles, O., $123; E. Chicago, Ind., Joliet, Rockdale, Ill., $125; Cutler, Utah, $116.55; Los Angeles, $122.85.

Insulating Fire Brick

2300° *F*: Massillon, O., $178.50; Clearfield, Pa., $213; Augusta, Ga., Beaver Falls, Zelienople, Pa., Mexico, Mo., $206; Vandalia, Mo., $214.10; Portsmouth, O., $207.50; Bessemer, Ala., $212.80.

Ladle Brick

Dry Pressed: Bessemer, Ala., $64.60; Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Pa., Wellsville, O., $77.50; Mexico, Mo., $73.50; Clearfield, Pa., Portsmouth, O., $83; Peria, Ark., $109; Los Angeles, $110.25; Pittsburg, Calif., $111.30.

Sleeves

Reesdale, Pa., $139.70; Johnstown, Pa., $140; Clearfield, Pa., $148.50; St. Louis, $151.80; Athens, Tex., $155.

Nozzles

Reesdale, Pa., $223.50; Johnstown, Pa., $229.20; Clearfield, Pa., $241.40; St. Louis, $247.10; Athens, Tex., $247.70.

Runners

Reesdale, Pa., $174; Johnstown, Pa., $177.80; Clearfield, Pa., $185.50; St. Louis, $187.30; Athens, Tex., $191.80.

High-Alumina Brick

50 *Per Cent*: Clearfield, Pa., St. Louis, Mexico, Mo., $179; Danville, Ill., $169.30.

60 *Per Cent*: St. Louis, Mexico, Vandalia, Mo., $223.00; Danville, Ill., $213.20.

70 *Per Cent*: St. Louis, Mexico, Vandalia, Mo., $225; Danville, Ill., $258; Clearfield, Pa., $252.

Dolomite

Domestic, dead-burned bulk: Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Narlo, Gibsonburg, Woodville, O., $14.50; Thornton, McCook, Ill., $14.60; Dolly Siding, Bonne Terre, Mo., $13.65.

Magnesite

Domestic, deadburned bulk; Luning, Nev., $38.

METALLURGICAL COKE

Price per net ton

Beehive Ovens

Connellsville, furnace	$14.50-15.00
Connellsville, foundry	16.50-17.00

Oven Foundry Coke

Kearney, N. J., ovens	$24.00
Everett, Mass., ovens:	
New England, deld.	*26.00
Chicago, ovens	24.50
Chicago, deld.	26.00
Terre Haute, ovens	24.05
Milwaukee, ovens	25.25
Indianapolis, ovens	24.25
Chicago, deld.	28.12
Cincinnati, deld.	25.85
Painesville, O., ovens	25.50
Cleveland, deld.	27.43
Erie, Pa., ovens	25.00
Birmingham, ovens	22.65
Cincinnati, deld.	27.58
Lone Star, Tex., ovens	18.50
Philadelphia, ovens	23.95
Swedeland, Pa., ovens	23.85
St. Louis, ovens:	
St. Louis deld.	26.00
St. Paul, ovens	23.75
Portsmouth, O., ovens	24.00
Cincinnati, deld.	26.62
Detroit, ovens	25.50
Detroit, deld.	26.50
Buffalo, deld.	28.08
Flint, deld.	28.23
Pontiac, deld.	27.06
Saginaw, deld.	28.58

*Or within $4.55 freight zone from works.

COAL CHEMICALS

Spot, cents per gallon, ovens

Pure benzol	40.00
Toluol, one deg.	30.00-33.00
Industrial xylol	30.00-33.50
Per ton, bulk, ovens	
Sulphate of ammonia	$44.45
Birmingham area	$49.50
Cents per pound, producing point	
Phenol, 40 deg. (U.S.P.), tank cars	18.00
c.l. drums	19.00
l.c.l. drums	19.50

FLUORSPAR

Metallurgical grades, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF$_2$ content 72.5%, $44; 70%, $42.50; 60%, $38. Imported, net ton, duty paid, metallurgical grade, $35-$36.

ELECTRODES

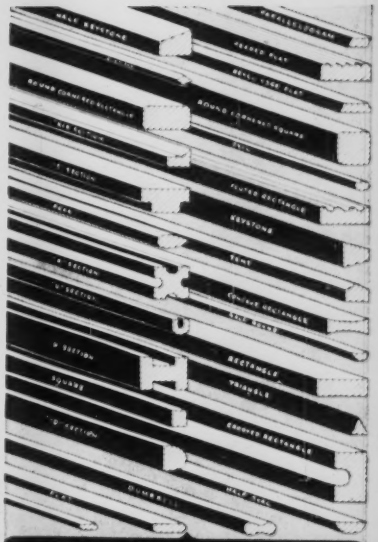
(Threaded with nipple, unboxed f.o.b. plant)

GRAPHITE

Inches Diam.	Length	Per 100 lb
2	24	$43.50
2½	30	28.00
3	40	27.25
4	40	26.00
5½	40	25.75
6	60	23.25
7, 8, 9, 10	60	21.00
12, 14	72	20.50
16	72	20.00
17	60	20.50
18	72	20.50
20	72	20.00

CARBON

40	100	$8.95
40, 35, 30	110	8.95
30	84	9.10
24	96	8.90
24	72, 84	9.10
20	90	8.95
20	84	9.10
17	72	9.10
17	60	9.50
14	72	9.50
14, 12, 10	60	10.30
8	60	10.55



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Wire . . .

(*Concluded from Page 144*)

regional delivered price sales basis similar to that recently instituted by a Cleveland hot-rolled carbon bar producer.

November Steel Output Slips

New York Production of 8,711,000 net tons of ingots and steel for castings in November raised total output for the first 11 months of this year to 103,684,339 tons, reports the American Iron & Steel Institute.

November output compared with 9,462,722 tons in October and 9,440,128 in November a year ago.

The 11-month output this year was greater than in any calendar year with the exception of 1951, and was only about 1.5 million tons short of the latter year's total.

Although November was the third month in which production lagged behind output in 1952, the total for 11 months set a record. The latter was 20.2 million tons higher than in the first 11 months of 1952 and 7.4 million tons higher than the previous record, set in the first 11 months of 1951.

Steelmaking furnaces operated at 90.1 per cent of capacity in November. This compares with 94.7 in October and 105.9 in November a year ago.

Operations this year are based on annual capacity of 117.5 million tons, and the Institute points out that more steel was produced at the 90.1 per cent average in November than could have been made at 100 per cent of capacity in the like month of 1951, when annual capacity was rated at 104.2 million tons.

	OPEN-HEARTH		BESSEMER		ELECTRIC		TOTAL		Calculated weekly production (net tons)	No. of weeks in mos.
	Net tons	% of capacity	Net tons	% of capacity	Net tons	% of capacity	Net tons	% of capacity		
1952										
January	*8,841,679	101.4	359,200	88.9	706,083	81.2	9,907,962	99.1	2,234,303	4.43
February	7,939,299	100.8	329,459	92.6	664,091	84.6	8,932,779	99.1	2,233,195	4.00
March	9,650,773	103.7	354,710	90.0	762,615	87.7	10,168,098	101.8	2,285,282	4.43
1st Qtr	26,431,751	102.0	1,043,299	90.4	2,132,789	84.5	29,008,839	100.0	2,251,964	12.86
April	*8,493,909	100.5	334,605	87.7	717,024	85.2	9,545,538	98.7	2,225,067	4.29
May	*9,525,163	102.3	354,577	90.0	717,340	82.5	9,997,080	100.1	2,256,677	4.43
June	*8,594,502	99.4	332,060	87.0	677,417	80.4	9,404,479	97.2	2,192,156	4.29
2nd Qtr	26,613,574	100.8	1,021,242	88.3	2,112,281	82.7	28,947,097	98.7	2,224,888	13.01
1st 6 Mo	51,045,325	101.4	2,065,541	89.3	4,245,070	83.6	57,945,936	99.4	2,238,856	25.87
July	*8,316,342	96.9	324,065	82.4	635,263	73.2	9,275,673	93.1	2,068,569	4.42
August	*8,463,159	97.0	310,674	78.7	632,841	72.7	9,406,680	94.2	2,123,156	4.43
Sept.	*8,976,277	95.8	287,638	77.6	619,413	71.6	*9,883,428	92.1	2,075,567	4.28
3rd Qtr	25,755,778	96.1	921,780	78.9	1,787,327	69.4	27,564,681	93.1	2,099,366	13.13
9 Mos	76,801,103	99.6	2,987,321	85.8	6,032,397	78.8	85,510,617	97.3	2,162,589	39.00
*Oct.	*8,648,428	99.1	325,240	82.6	489,044	66.3	9,462,722	94.7	2,136,055	4.43
†Nov.	*8,021,000	94.9	283,000	74.2	407,000	48.3	8,711,000	90.1	2,031,000	4.29
1952										
1st Qtr	24,207,329	102.5	1,168,871	87.4	1,824,524	89.1	27,200,724	100.7	2,062,363	13.00
April	2,161,199	91.1	323,096	78.2	567,935	84.1	7,992,119	89.7	1,862,970	4.29
May	7,291,865	90.6	318,642	69.9	595,135	85.3	8,205,642	89.2	1,852,289	4.43
June	1,446,927	18.6	22,862	5.2	170,000	25.2	1,639,789	18.4	382,235	4.29
2nd Qtr	10,899,991	67.0	664,510	49.6	1,333,070	65.1	17,837,571	66.0	1,371,666	13.01
1st 6 Mo	10,017,320	84.8	1,833,381	68.5	3,157,594	77.1	45,038,295	83.4	1,731,576	26.01
July	1,347,387	16.8	2,000	0.4	277,859	39.9	1,627,446	17.7	368,200	4.42
August	7,500,888	94.1	309,361	67.8	599,476	84.6	8,409,725	92.4	1,918,674	4.43
Sept.	*8,639,128	103.4	351,620	79.8	672,539	99.8	9,663,287	102.0	2,117,500	4.28
3rd Qtr	19,986,603	71.2	662,981	49.1	1,549,874	74.5	19,700,458	70.4	1,461,573	13.13
9 Mos	37,033,923	80.2	2,496,362	62.9	4,698,468	76.2	64,228,753	79.0	1,641,009	39.14
Oct.	*8,747,649	105.7	347,012	76.1	713,402	102.3	9,808,084	100.6	2,214,014	4.43
Nov.	*8,396,227	107.7	336,902	76.3	706,999	104.7	9,440,128	105.9	2,200,496	4.29

Note: The percentages of capacity in 1953 are calculated on weekly capacities of 1,969,275 net tons open-hearth, 85,934 net tons bessemer and 136,249 net tons electric ingots and steel for castings, total 2,241,459 net tons, based on annual capacities as of Jan. 1, 1953, as follows: Open-hearth 102,677,980 net tons, bessemer 4,637,000 net tons, electric 10,232,190 net tons, total 117,547,170 net tons. The percentages of capacity operated in 1952 are calculated on weekly capacities of 1,816,637 net tons open-hearth, 102,926 net tons bessemer and 137,477 net tons electric ingots and steel for castings, total 2,057,040 net tons, based on annual capacities as of Jan. 1, 1952, as follows: Open-hearth 94,973,780 net tons, bessemer 5,381,000 net tons, electric 8,232,890 net tons; total 108,587,670 net tons.

*Revised.
†Preliminary figures, subject to revision.

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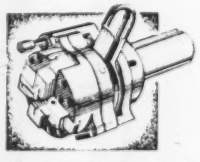

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Gas Main Safety

Bailey Thermal Expansion Goggle Valves form tight, leak-proof seals to close mains from 36" to 120" in diameter

AN UNFAILING force of nature—the linear expansion and contraction of steel—is being used to increase steel mill safety. The larger sized gas mains are closed safely and efficiently by Bailey Thermal Expansion Goggle Valves. In them the powerful force exerted by the linear expansion of three steel tubes is used to free or clamp the goggle plate—providing an absolutely gas-tight seal.

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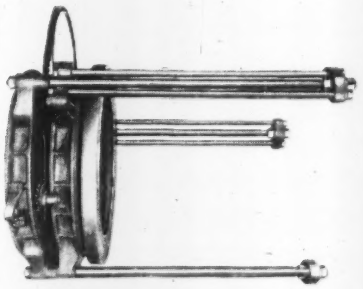

Bailey Thermal Expansion Goggle Valves are produced in diameters from 36" to 120".

so it may be swung to the open or closed position. When the steam is shut off, contraction of the tubes takes place, closing the flanges tightly against the goggle plate. Since both sides of the plate are machined to conform to the machined edges of the valve flange, Bailey Valves are leak-proof in both open and closed positions.

Sound design and precision manufacture are combined in these valves to assure the ultimate in safety and reliability. They have been thoroughly proved on the gas mains of blast furnaces, gas washers and boiler plants. Bailey Thermal Expansion Goggle Valves are completely dependable in hot or cold, dirty or clean gas mains.

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Tool Steel . . .

Tool Steel Prices, Page 130

New York—Shipments of high speed and tool steel (excluding hollow drill steel) in October amounted to 9196 net tons, reports the American Iron & Steel Institute. This compares with shipments of 8580 tons in September and with 10,429 in October, 1952.

Total shipments in the first 10 months this year were reported at 99,820 net tons, comparing with 103,482 in the corresponding period of last year.

Iron Ore . . .

Iron Ore Prices, Page 149

Cleveland—Despite the fact vessel activity was slower in November than in recent years, the Great Lakes fleet established a new record in the combined tonnage of iron ore, coal and grain carried during the 1953 season to Dec. 1, according to the Lake Carriers' Association.

Cargoes moved to that date totaled 164,480,105 net tons, comparing with the previous record of 154,955,588 tons set in 1942. The season saw a record 95,844,449 gross tons of iron ore hauled, and was the first year since 1944 in which shipments of ore were completed in November.

During that month ore cargoes dropped to 5,300,431 tons from 9,294,947 tons moved in the corresponding month of 1952.

November coal shipments were 3,181,380 net tons, comparing with 3,172,535 a year ago.

Grain shipments in the month totaled 2,217,443 net tons, down slightly from the 2,252,709 tons moved in November, 1952. While grain tonnage was lower the actual number of bushels moved was approximately 1 million higher, due to the fact there was a substantial movement of so-called "light" grains last month.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

1010 tons, first contract, grade crossing elimination, Lincoln Square, Worcester, Mass., to Bethlehem Steel Co., Bethlehem, Pa.; Farina Bros. Co., Newton, Mass., general contractor.

2200 tons, double cantilever maintenance hangar, Westover Airfield Base, Chicopee Falls, Mass., to American Bridge Division, U. S. Steel Corp., Pittsburgh; F. D. Rich Co., Stamford, Conn., general contractor.

2000 tons, state office building, Harrisburg, Pa., to American Bridge Division, U. S. Steel Corp., Pittsburgh.

900 tons, addition, Schiller steam power plant, Portsmouth, N. H., to Lyons Iron Works, Manchester, N. H.; Public Service Co. of New Hampshire, J. F. Lyons, project engineer; Sanders Construction Corp., Portland, Me., general contractor.

(Please Turn to Page 154)

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IRON AND STEEL SCRAP

Consumer prices, per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL. Changes shown in italics.

STEELMAKING SCRAP COMPOSITE

Dec. 17	$32.00
Dec. 10	33.00
Nov. avg.	35.00
Dec. 1952	43.00
Dec. 1948	43.25

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

PITTSBURGH

(Delivered consumer plant)

No. 1 heavy melting	33.00-34.00
No. 2 heavy melting	*29.00-30.00*
No. 1 bundles	33.00-34.00
No. 2 bundles	*28.00-29.00*
No. 1 bushelling	33.00-34.00
Machine shop turnings	19.00-20.00
Mixed borings, turnings	19.00-20.00
Short shovel turnings	*31.00-32.00*
Cast iron borings	*30.00-31.00*
Cut structurals	*36.00-37.00*
Heavy turnings	30.00-31.00
Punchings & plate scrap	*35.00-36.00*
Electric furnace bundles	*36.00-37.00*

Cast Iron Grades

No. 1 cupola	37.00-38.00
Charging box cast	*36.00-37.00*
Heavy breakable cast	*34.00-35.00*
Unstripped motor blocks	*29.00-30.00*
No. 1 machinery cast	44.00-45.00

Railroad Scrap

No. 1 RR. heavy melt	*47.00-48.00*
Rails, 2 ft and under	*46.00-47.00*
Rails, 18 in. and under	*47.00-48.00*
Rails, random lengths	*49.00-50.00*
Railroad specialties	*47.00-48.00*

Stainless Steel Scrap
(F.o.b. shipping point)

18-8 bundles & solids	165.00-170.00
18-8 turnings	*85.00-90.00*
430 bundles & solids	*85.00-87.00*
430 turnings	60.00-62.00

CLEVELAND

(Delivered consumer plant)

No. 1 heavy melting	*29.00-30.00*
No. 2 heavy melting	*25.00-26.00*
No. 1 bundles	*29.00-30.00*
No. 2 bundles	*24.00-25.00*
No. 1 busheling	*29.00-30.00*
Machine shop turnings	17.00-18.00
Mixed borings, turnings	*21.00-22.00*
Short shovel turnings	*24.00-25.00*
Cast iron borings	*24.00-25.00*
Low phos.	*41.00-42.00*
Alloy free, short shovel turnings	24.00-25.00
Electric furnace bundles	31.00-32.00

Cast Iron Grades

No. 1 cupola	*41.00-42.00*
Charging box cast	*29.00-30.00*
Stove plate	*36.00-37.00*
Heavy breakable cast	*25.00-26.00*
Unstripped motor blocks	*24.00-25.00*
Brake shoes	*33.00-34.00*
Clean auto cast	*41.00-41.00*
No. 1 wheels	*49.00-50.00*
Burnt cast	*40.50-41.50*
Drop broken machinery	*43.00-44.00*

Railroad Scrap

No. 1 R.R. heavy melt	34.00-35.00
R.R. malleable	44.00-45.00
Rails, 3 ft and under	45.00-46.00
Rails 18 in. and under	44.00-45.00
Rails random lengths	41.00-42.00
Cast steel	40.00-41.00
Railroad specialties	37.00-38.00
Uncut tires	39.00-40.00
Angles, splice bars	44.00-45.00
Rails, rerolling	45.00-46.00

Stainless Steel
(F.o.b. shipping point)

18-8 bundles, solids	nom. 160.00-170.00
18-8 turnings	nom. 70.00-80.00
430 clips, bundles, solids	nom. 70.00
430 turnings	nom. 50.00

YOUNGSTOWN

(Delivered consumer plants)

No. 1 heavy melting	*29.00-30.00*
No. 2 heavy melting	*28.00-29.00*
No. 1 bundles	*29.00-30.00*
No. 2 bundles	*27.00-28.00*
Machine shop turnings	16.00-17.00
Short shovel turnings	*25.00-27.00*
Cast iron borings	*25.00-27.00*
Low phos.	*41.00-42.00*
Electric furnace bundles	*41.00-42.00*

Railroad Scrap

No. 1 R.R. heavy melt	34.00-35.00

PHILADELPHIA

(Delivered consumer plant)

No. 1 heavy melting	*41.00**
No. 2 heavy melting	*28.00**
No. 1 bundles	*41.00**
No. 2 bundles	*26.00**
No. 1 bushelling	33.00*
Electric furnace bundles	*43.00-44.00*
Machine shop turnings	*19.00*
Mixed borings, turnings	*24.00*
Short shovel turnings	*28.00*
Structurals & plate	*48.00*
Heavy turnings	26.00
Couplers, springs, wheels	*47.00-48.00*
Rail crops, 2 ft & under	*46.00*

Cast Iron Grades

No. 1 cupola	35.00-36.00
Heavy breakable cast	38.50
Unstripped motor blocks	28.00
Drop broken machinery	*40.00-42.00*

*Truck shipments to Conshohocken, Pa., $4 lower.

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	*24.00-24.00*
No. 2 heavy melting	*18.50-19.00*
No. 1 bundles	*24.00-24.00*
No. 2 bundles	*16.50-17.50*
Machine shop turnings	*9.00-10.00*
Mixed borings, short turnings	*12.00-13.00*
Low phos. (structural & plate)	*25.00-26.00*
Short shovel turnings	*13.00-14.00*

Cast Iron Grades

No. 1 cupola	29.00-30.00
Unstripped motor blocks	21.00-22.00

Stainless Steel

18-8 sheets, clips solids	*160.00-165.00*
18-8 borings, turnings	50.00-60.00
430 sheets, clips, solids	*75.00-80.00*
410 sheets, clips, solids	*65.00-70.00*

BOSTON

(Brokers' buying prices, f.o.b. shipping point)

No. 1 heavy melting	23.00-24.00
No. 2 heavy melting	18.25-19.25
No. 1 bundles	23.00-24.00
No. 2 bundles	16.25-17.25
Machine shop turnings	*10.50-11.00*
Mixed borings, turnings	*13.00-14.00*
Short shovel turnings	*14.00-14.50*
No. 1 cast	29.00-30.00
Mixed cupola cast	27.00-28.00
No. 1 machinery cast	36.00-37.00

CINCINNATI

(Brokers' buying prices, f.o.b. shipping point)

No. 1 heavy melting	*28.00-29.00*
No. 2 heavy melting	*25.00-26.00*
No. 1 bundles	*28.00-29.00*
No. 2 bundles	*22.00-23.00*
No. 1 bushelling	*28.00-29.00*
Machine shop turnings	*12.00-13.00*
Mixed borings, turnings	*15.00-16.00*
Short shovel turnings	*15.00-16.00*
Cast iron borings	*15.00-16.00*
Low phos., IX in.	*37.00-38.00*

Cast Iron Grades

No. 1 cupola	37.00
Heavy breakable cast	34.00
Charging box cast	34.00
Drop broken machinery	46.00

Railroad Scrap

No. 1 R.R. heavy melt	*42.00-43.00*
Malleable	*48.00-49.00*
Rails, 18 in. and under	46.00-47.00
Rails, random lengths	38.00-39.00

CHICAGO

No. 1 heavy melting	*41.00-42.00*
No. 2 heavy melting	*27.00-28.00*
No. 1 factory bundles	33.00-34.00
No. 1 dealer bundles	30.00-31.00
No. 2 bundles	24.00-25.00
No. 1 bushelling	*41.00-42.00*
Machine shop turnings	14.00-15.00
Mixed borings, turnings	14.00-15.00
Short shovel turnings	16.00-17.00
Cast iron borings	16.00-17.00
Cut structurals, 3-ft	35.00-36.00
Punchings & plate scrap	36.00-37.00
Electric furnace bundles	*43.00-44.00*

Cast Iron Grades

No. 1 cupola	33.00-34.00
Stove plate	27.00-28.00
Unstripped motor blocks	19.00-20.00
Clean auto cast	38.00-40.00
Drop broken machine	38.00-40.00

Railroad Scrap

No. 1 RR. heavy melt	*43.00-44.00*
R.R. malleable	40.00-41.00
Rails, 2-ft and under	45.00-46.00
Rails 18-in. and under	47.00-48.00
Angles, splice bars	*48.00-49.00*
Rails, rerolling	*42.00-43.00*

Stainless Steel Scrap

18-8 clips & solids	140.00-160.00
18-8 turnings	nom. 70.00
430 clips & solids	70.00
430 turnings	nom. 30.00

DETROIT

(Brokers' buying prices, f.o.b. shipping point)

No. 1 heavy melting	*25.00*
No. 2 heavy melting	*19.50*
No. 1 bundles	*26.00*
No. 2 bundles	*19.00*
No. 1 bushelling	*24.50*
Machine shop turnings	*12.00*
Mixed borings turnings	*12.00*
Short shovel turnings	*13.50*
Punchings & plate scrap	*28.00*

Cast Iron Grades

No. 1 cupola	*36.00*
Charging box cast	*28.00*
Stove plate	*30.00*
Heavy breakable	*27.00*
Unstripped motor blocks	*22.00*
Clean auto cast	*38.00*
Malleable	*38.00*

BUFFALO

No. 1 heavy melting	*29.00-30.00*
No. 2 heavy melting	*26.00-26.50*
No. 1 bundles	*29.00-30.00*
No. 2 bundles	*24.00-24.50*
No. 1 bushelling	*29.00-30.00*
Machine shop turnings	*16.50-17.50*
Mixed borings, turnings	*18.50-19.00*
Short shovel turnings	*19.50-20.00*
Cast iron borings	*18.50-19.00*
Low phos.	*33.00-34.00*

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	32.00-33.00
No. 1 machinery	37.00-38.00

Railroad Scrap

Rails, random lengths	*36.00-37.00*
Rails, 2 ft and under	*41.00-42.00*
Railroad specialties	*39.00-40.00*

BIRMINGHAM

No. 1 heavy melting	26.00-26.50
No. 2 heavy melting	24.00-24.50
No. 1 bundles	26.00-26.50
No. 2 bundles	22.00-22.50
Machine shop turnings	19.50-20.50
Short shovel turnings	20.50-21.50
Cast iron borings	20.50-21.50
Cut structurals	nom.
Electric furnace bundles	nom.

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	41.00-42.50
Charging box cast	30.00-31.00
Stove plate	38.00-39.00
Bar crops and plate	38.00-39.00
Cut structurals	36.00-37.00
Heavy breakable cast	30.00-31.00
Unstripped motor blocks	34.00-35.00
No. 1 wheels	46.00-47.00

Railroad Scrap

No. 1 R.R. heavy melt	nom.
Rails, 2-ft and under	42.00-43.00
Rails, random lengths	39.00-40.00
Angles, splice bars	38.00-39.00
Rails, rerolling	46.00-47.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	28.00
No. 2 heavy melting	26.00
No. 1 bundles	28.00
No. 2 bundles	24.00
Machine shop turnings	*11.00-12.00*
Short shovel turnings	*12.00-13.00*

Cast Iron Grades

No. 1 cupola	38.00-39.00
Charging box cast	*37.00-38.00*
Heavy breakable cast	*29.00-30.00*
Unstripped motor blocks	*27.00-28.00*
Brake shoes	35.00-36.00
Clean auto cast	39.00-40.00
Burnt cast	*38.00-39.00*

Railroad Scrap

No. 1 R.R. heavy melt	31.00
Rails 18-in. and under	44.00-45.00
Rails random lengths	38.00-39.00
Rails, rerolling	41.00-42.00
Uncut tires	*50.00-51.00*
Angles, splice bars	35.00-36.00

SEATTLE

(Delivered consumer plant)

No. 1 heavy melting	27.00
No. 2 heavy melting	23.00
No. 1 bundles	24.00
No. 2 bundles	19.00
No. 3 bundles	15.00
Machine shop turnings	12.00
Mixed borings, turnings	12.00
Short shovel turnings	12.00
Electric furnace, No. 1	36.00-38.00

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	30.00-35.00
Heavy breakable cast	25.00-32.00
Unstripped motor blocks	23.00
No. 1 wheels	38.00-40.00
Stove plate	29.00

Railroad Scrap
(Delivered consumer plant)

Rails, random lengths	30.00-34.00

SAN FRANCISCO

No. 1 heavy melting	23.00
No. 2 heavy melting	19.00
No. 1 bundles	22.00
No. 2 bundles	19.00
No. 1 bushelling	24.00
Machine shop turnings	7.00
Mixed borings, turnings	7.00
Short shovel turnings	11.00
Cast iron borings	11.00
Cut structurals	28.00
Heavy turnings	11.00
Punchings & plate scrap	28.00
Electric furnace bundles	22.00

Cast Iron Grades

No. 1 cupola	39.00
Charging box cast	35.00
Stove plate	37.00
Heavy breakable cast	36.00
Unstripped motor blocks	29.00
Brake shoes	35.00
Clean auto cast	39.00
No. 1 wheels	39.00
Burnt cast	23.00
Drop broken machinery	43.00

LOS ANGELES

No. 1 heavy melting	23.00
No. 2 heavy melting	19.00
No. 1 bundles	22.00
No. 2 bundles	19.00
Machine shop turnings	7.00

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	40.00-41.00

HAMILTON, ONT.

(Delivered prices)

Heavy melting	$32.50
No. 1 bundles	32.50
No. 2 bundles	32.00
Mechanical bundles	30.50
Mixed steel scrap	28.50
Mixed borings, turnings	20.00
Rails, remelting	32.50
Rails, rerolling	41.50
Bushelling	26.50
Bushelling, new factory:	
Prep'd	30.50
Unprep'd	28.50
Short steel turnings	20.00

Cast Iron Grades†

No. 1 machinery cast	46.00

†F.o.b., shipping point.

SCRAP *at your Service!*

The facilities and experienced personnel in each of our offices, stand ready to supply your every scrap requirement whenever and wherever needed.

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READING, PENNA. PITTSBURGH, PENNA.
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CLEVELAND, OHIO	NEW YORK, N. Y.	SAN FRANCISCO, CAL.
	SEATTLE, WASH.	

LEADERS IN IRON AND STEEL SCRAP SINCE 1889

(Concluded from Page 151)

575 tons, four state highway bridges, Needham-Wellesley, Mass., to Groisser & Shlager Iron Works, Somerville, Mass., through M. DeMatteo Construction Co., Quincy, Mass., general contractor.

500 tons, state bridge work, Philadelphia, to American Bridge Division, U. S. Steel Corp., Pittsburgh.

465 tons, six state bridges, Brockton-West Bridgewater, Mass., section, Boston-Fall River expressway, to Builders Iron Works, Providence, R. I., through General Engineering Co., Providence, R. I., sub-contractor to J. F. White Construction Co., Boston, general contractor.

460 tons, state bridge work, Lancaster-Chester counties, Pennsylvania, through J. Richard Nissley, Landisville, Pa., general contractor, to Bethlehem Steel Co., Bethlehem, Pa.

305 tons, state highway bridge, route 3, Bedford, Mass., to Bethlehem Steel Co., Bethlehem, Pa.; George Brox, Inc., Hudson, Mass., general contractor.

265 tons, county bridge, York county, Pennsylvania, through Steward & March, Inc., general contractor, to Bethlehem Steel Co., Bethlehem, Pa.

225 tons, two state bridges, Willington-Tolland-Ellington, Conn., section, to Bethlehem Steel Co., Bethlehem, Pa., through Simpson & Whitehouse, Manchester, Conn., general contractor.

165 tons, warehouse, Bangor, Me., to A. O. Wilson Structural Co., Cambridge, Mass.

160 tons, building additions, State Teachers' College, Lowell, Mass., to Groisser & Shlager Iron Works, Somerville, Mass.; Columbia Construction Co., Boston, general contractor.

100 tons, factory building, General Electric Co., Newton, Mass., to Bethlehem Fabricators Inc., Boston.

STRUCTURAL STEEL PENDING

25,000 tons, approximately, 41-story Esso Standard Oil office building, 42nd St. and Lexington Ave., New York City, bids asked.

5500 tons, construction, Army Air Base, Plattsburg, N. Y., bids Dec. 22.

150 tons, boiler house extension, Downingtown Paper Co., Downingtown, Pa., bids Dec. 22.

Unstated, two intake gates, Dexter dam, Oregon, Todd Shipyards, Houston, Tex., low at $42,000, to U. S. Engineer; Berger Engineering Co., Seattle, low $34,658 for gate hoists, tonnage also unstated.

REINFORCING BARS . . .

REINFORCING BARS PLACED

425 tons, addition, Schiller steam power plant, Portsmouth, N. H., Public Service Co. of New Hampshire, J. E. Lyons, project engineer; Sanders Construction Corp., Portland, Me., general contractor.

250 tons, dormitories, University of Connecticut, Storrs, Conn., to Bethlehem Steel Co., Bethlehem, Pa.; Gilbane Building Co., Providence, R. I., general contractor.

240 tons, highway bridge and ramps, contract 3, Agawam, Mass., to Truscon Steel Division, Republic Steel Corp., Boston; Henley & Lundgren Co., Shrewsbury, Mass., general contractor.

175 tons, state highway bridge, route 3, Bedford, Mass., to Northern Steel Co., Inc., Medford, Mass.; George Brox, Inc., Hudson, Mass., general contractor.

135 tons, office building, Worcester Mutual Fire Insurance Co., Worcester, Mass., to Joseph T. Ryerson & Son, Inc., Cambridge, Mass.; E. J. Cross Co., Worcester, general contractor.

100 tons, additions, State Teachers' College, Lowell, Mass., to Northern Steel Co., Medford, Mass.; Columbia Construction Co., Boston, general contractor.

100 tons, addition, Jewish Memorial Hospital, Roxbury, Mass., to Bethlehem Steel Co., Bethlehem, Pa.; M. Shiltnick Corp., Boston, general contractor.

REINFORCING BARS PENDING

594 tons, Garden state parkway, contract No. 56, section 7, Middlesex county, New Jersey, bids Jan. 14.

200 tons, Fairbanks, Alaska, high school, general, bids in Dec. 15.

Unstated, 600-ft steel and concrete Montana highway bridge, Broadwater county, bids to Helena, Mont., Dec. 17.

PLATES . . .

PLATES PENDING

625 tons, standpipe, Camden, N. J., bids Dec. 23.

500 tons or more, nine storage tanks, bids to Tidewater Associated Oil Co., 1753 Alaskan Way, Seattle, Dec. 18.

Unstated, five steel bulk grain storage tanks, $2 million project, plans being completed by Port of Seattle.

PIPE . . .

STEEL PIPE PENDING

Unstated, two schedules, 11.0 feet, 6 and 4-inch water pipe, and fittings, Alderwood Manor Water District, Wash., bids to Ivy Stallsmith, secretary, Dec. 21.

RAILS, CARS . . .

LOCOMOTIVES PLACED

Virginian railway, 25 diesel electric locomotives, to Fairbanks, Morse & Co., Chicago.

RAILROAD CARS PLACED

Canadian Pacific, 18 stainless baggage-dormitory cars, to Budd Co., Philadelphia.

Canadian National, one rail diesel car to the Budd Co., Philadelphia.

Pennsylvania, 20 fifty-ton box cars, to Pullman-Standard Car Mfg. Co., Chicago.

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FREE CATALOG

MOTORS-GENERATORS-TRANSFORMERS
New and Guaranteed Rebuilt
1 H.P. to 2500 H.P.
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FOR SALE
1—#6 HILLES & JONES VERTICAL OPEN SIDE BAR SHEAR, CAPACITY 3½" ROUNDS, INCLUDING 15 HP, 230 VOLT D.C. MOTOR. EST. WT. 50,000 LBS.
FRANK B. FOSTER, INC.
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THREADED Rods

10 to 12 ft. lengths
ALL METALS
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Largest Inventory on Pacific Coast
DULIEN STEEL PRODUCTS, INC.
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NEW GAS BURNERS
AT A TREMENDOUS SAVING
36—#200 Tate-Jones Universal Burner Sets, 1,400,000 BTU input per hour.
16—#100, as above, 700,000 BTU input per hour.
Burners are complete with auxiliary equipment. They are for use with steel furnaces, heat treating, forging, steel mills, incinerators, brick furnaces and other uses. Detailed spec. and price on request.
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WANTED

CONTRACT WORK. Separate mixed and classify unidentified steel. Fifteen years spark-testing experience. Hot mills cold drawn, parts manufactures. AISI, Tool, Trade, Super Alloy steels. Specialize in separation tungsten-moly stainless scrap and heat resisting alloys. David S. Bowman, 31 Iris St., Indianapolis, Indiana. Phone CY-1065.

Help Wanted

INDUSTRIAL ENGINEER, with managerial experience for job galvanizing plant. Periodic incentive bonus. Replies confidential. Reply Box 881, STEEL, Penton Bldg., Cleveland 13, Ohio.

PLANT MANAGER, preferably with hot dip galvanizing experience. Replies confidential. Reply Box 882, STEEL, Penton Bldg., Cleveland 13, Ohio.

PRODUCTION DEVELOPMENT ENGINEER. Qualified Mechanical Engineer in charge of Production Development Engineering for well established producer of Electric Welded Steel Tubing. Experienced, hard working, intelligent man will receive excellent opportunity and salary. Reply confidential. Write Box 869, STEEL, Penton Bldg., Cleveland 13, Ohio.

ASSISTANT SUPERINTENDENT

Small sheet metal fabricating plant. Must have full knowledge of sheet metal layout and be able to set up and follow through on production work. Can learn the handling of men on the job. State age, experience, references and salary desired. Cleveland area. Reply Box 875, STEEL, Penton Bldg., Cleveland 13, Ohio.

Positions Wanted

PLANT MANAGER, 20 years' experience in Plant Management, Production Control, Manufacturing Development. Could invest. Age 45, married, family. Reply Box 874, STEEL, Penton Bldg., Cleveland 13, Ohio.

PLANT OR PRODUCTION MANAGER. Experience covers all phases of plant operation and control, including, costs, methods improvement, incentives and labor relations. M.I.T. graduate. Reply Box 888, STEEL, Penton Bldg., Cleveland 13, Ohio.

EXECUTIVE

AVAILABLE FOR RESPONSIBILITY OF TOP MANAGEMENT NATURE. METAL FABRICATION, MACHINERY, PRESSURE VESSELS. PROFIT-MAKING RECORD IN ADMINISTRATION ALL PHASES OF PLANT OPERATION. REPLY BOX 872, STEEL, PENTON BLDG., CLEVELAND 13, OHIO.

Accounts Wanted

WELL ESTABLISHED MANUFACTURER'S REPRESENTATIVE covering Alabama, Tennessee, Mississippi, North Carolina, South Carolina, Georgia and Florida. Can handle material handling equipment, power tools and allied lines. Engineering background. Write Box 879, STEEL, Penton Bldg., Cleveland 13, Ohio.

Employment Service

SALARIED POSITIONS $3,500 TO $35,000. WE offer the original personal employment service (established 43 years). Procedure of highest ethical standards is individualized to your personal requirements. Identity covered; present position protected. Ask for particulars. R. W. BIXBY, INC., 110 Dun Bldg., Buffalo 2, N. Y.

For Sale

PLANT FOR SALE

Copper, Nickel, Chrome Plating Plant for sale in Central Indiana. Plant is equipped with semi-automatic copper and nickel tanks, continuous filtration with modern chrome facilities. Building contains 17,500 square feet, 35% of which is occupied by plating department, the balance available for manufacturing. Concrete block building, ample electricity, water, steam and labor available. Plant could be put in operation at once. Owner plated automotive die cast parts in substantial quantities and vacated plant because facilities were outgrown. Reply Box 883, STEEL, Penton Bldg., Cleveland 13, Ohio.

RAILROAD EQUIPMENT—*FOR SALE*

USED **AS IS** **RECONDITIONED**

STANDARD GAUGE FREIGHT CARS

Box, Steel Sheathed, 40-Ton Capacity
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Gondolas, Composite, or All Steel 50-Ton and 70-Ton
Hoppers, Twin, All-Steel, 50-Ton, Cross Dump
Ore Hoppers, All-Steel, 50-Ton, Heavy Duty
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Tank, 8,000-Gallon, Coiled and Non-Coiled
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Eight Wheel, Cupola Type

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ONE ALCO STANDARD GAUGE DIESEL-ELECTRIC LOCOMOTIVE

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STORAGE TANKS
6,000 Gallon
8,000 Gallon
10,000 Gallon

"ANYTHING containing IRON or STEEL"

WANTED PRODUCTION MANAGER

Ohio Structural Steel Fabricator offers excellent opportunity to experienced man. Send qualifications.

Reply Box 880, STEEL
Penton Building **Cleveland 13, Ohio**

CHIEF DRAFTSMAN—STRUCTURAL ENGINEER

WANTED — Chief Draftsman — Structural Engineer fully qualified to take complete charge of Drafting Department (about 30 men) of a Company located in northerly area of the Central States.

This is a Structural Steel Fabricating Plant and applicants must have gained experience with a fabricating concern.

Replies will be treated confidentially and appointments made for personal interviews.

Reply Box 876, STEEL
Penton Building **Cleveland 13, Ohio**

OPERATING MAN

for New Hot and Cold Rolled SHEET STRIP MILL

One of the fastest growing, most progressive, integrated steel makers in the country has an opening for an experienced operating man who has qualifications of division superintendent caliber. For personal interview at a time and place convenient to you, write telling of your experience, age, salary requirements. All replies will be held in confidence. Address your application to Box 877, STEEL, Penton Building, Cleveland 13, Ohio.

SHIPMENTS From COMPLETE STOCKS

RAILS NEW & RELAYING

Call Foster for all sizes and sections —also Switch Material to your exact specifications.

RENTAL STEEL SHEET PILING

Exact lengths and sections, delivered *on time* from nationwide warehouses. Also Rental Pile Hammers & Extractors. Write your nearest Foster Office.

L. B. FOSTER CO.

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HOUSTON 2 • LOS ANGELES 5

METALLURGIST

for New Cold Sheet-Strip Mill

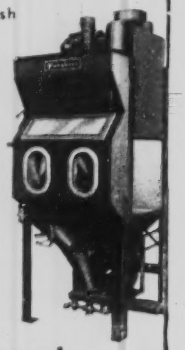
Here's a splendid opportunity for an energetic man to start at a good salary on the ground floor with a progressive integrated steel maker opening a brand new mill. You should have enough experience to be capable of handling complete cold mill practices including annealing. Customer contact experience is desirable but not absolutely necessary. For personal interview tell us about yourself—your experience, age, marital status, salary desired. Write in confidence. Our men have been informed regarding the placing of this advertisement. All replies will naturally be held strictly confidential. Address your application to Box 878, STEEL, Penton Bldg., Cleveland 13, Ohio.

HERE ARE 2 ANSWERS TO YOUR PRODUCTION PROBLEMS!

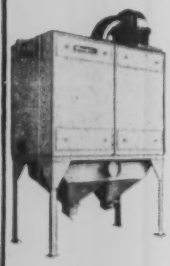
Pangborn cuts costs, saves time

(1) Precision Finishing

Pangborn Hydro-Finish Cabinet Removes scale and directional grinding lines . . . holds tolerances to .0001" and prepares surfaces for painting or plating. Liquid blast reduces costly hand cleaning and finishing of molds, dies, tools, etc. Models from . . . **$1410** and up.



(2) Dust Control



Pangborn Unit Dust Collector Traps dust at the source. Machine wear and tear is minimized, housekeeping and maintenance costs reduced. Solves many grinding and polishing nuisances and allows reclamation of valuable material. Models from . . . **$286** and up.

Pangborn Blast Cleaning Machines Portable model cleans structures, bridges, tanks, quickly and economically . . . $188 and up. Stationary cabinet saves time and money cleaning small metal parts . . . $319 and up.

Write for details on these machines to: PANGBORN CORPORATION, 1600 Pangborn Blvd., Hagerstown, Md.

Look to Pangborn for the latest developments in Blast Cleaning and Dust Control equipment

Pangborn

BLAST CLEANS CHEAPER with the right equipment for every job

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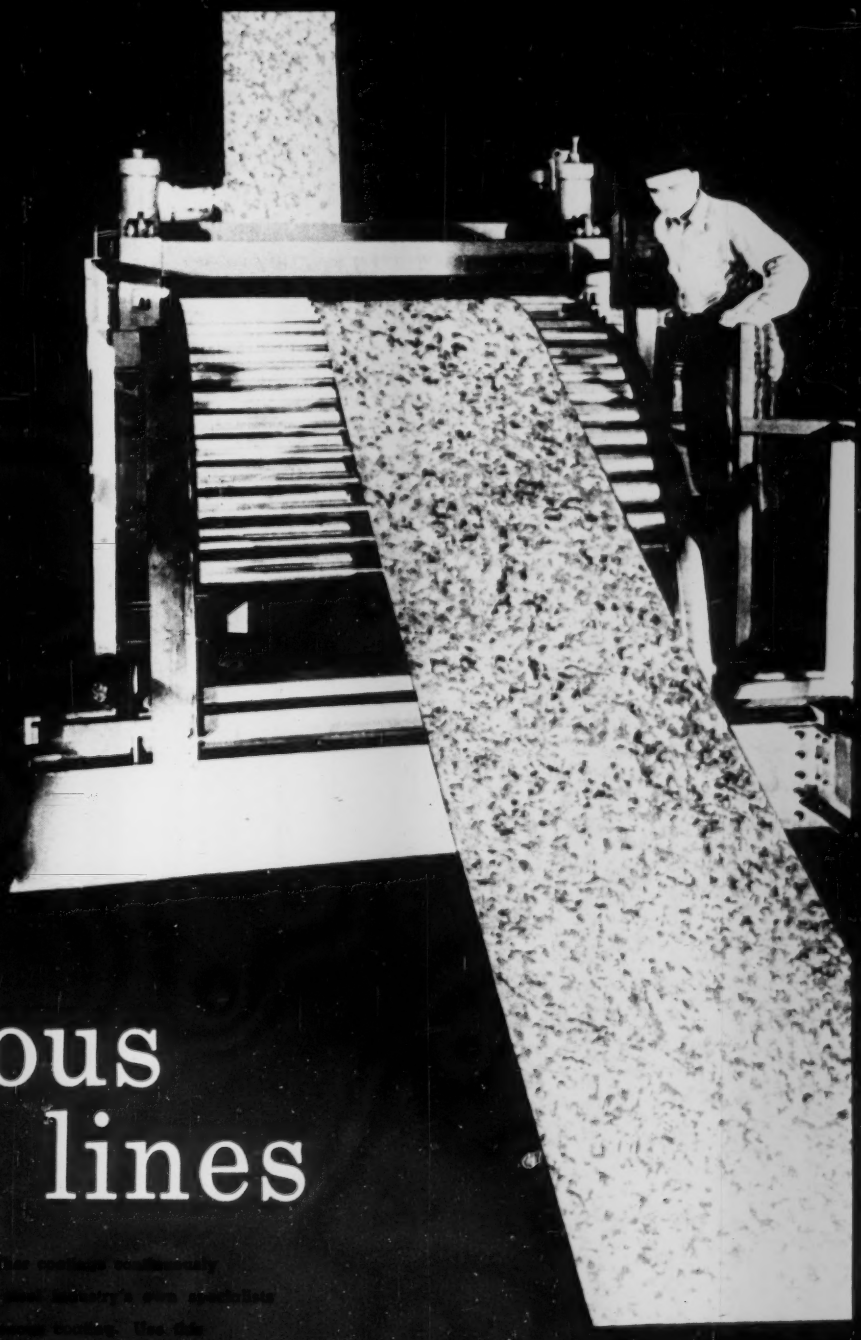

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Designers and Builders to the Ferrous, Non-Ferrous, Leather and Rubber Industries

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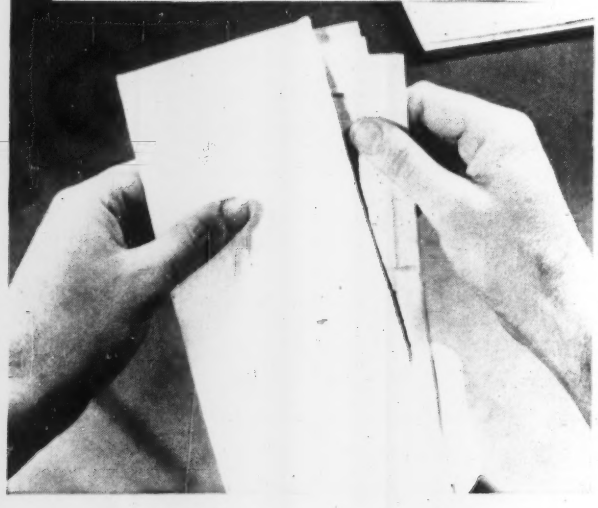
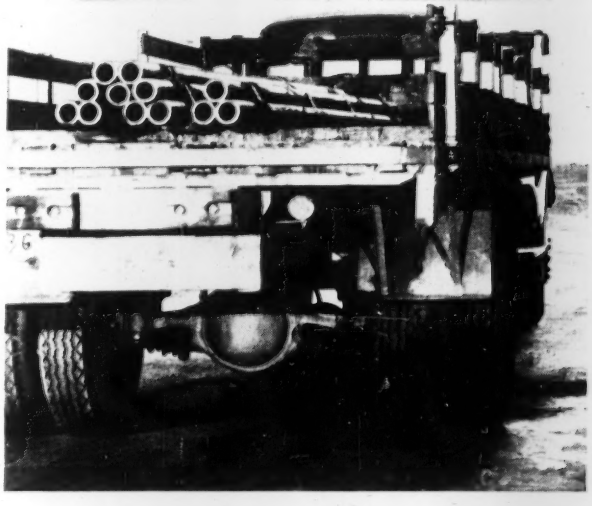


ON THE WAY BY
9:17 A.M.
TUESDAY



TIMKEN® 52100 steel tubing shipped from mill stock within 24 hours after you order

WE'LL give you rush service on 52100 tubing whenever you've got a rush hollow parts job. Order it today, in less-than-mill quantities, and we'll ship it tomorrow—within 24 hours.

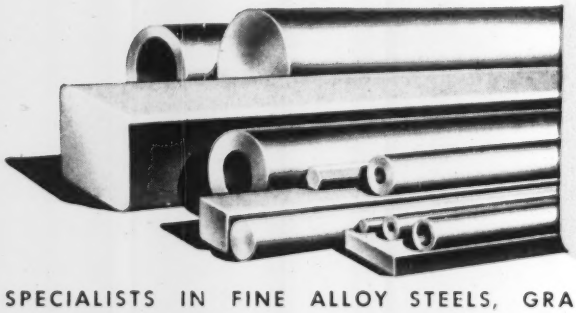
Timken® 52100 tubing is ideal for most of your hollow parts jobs because it's a through-hardening steel in moderate sections, and can be substituted for more expensive steels. It can be heat treated to file hardness and tempered back to any desired point.

Ranging in sizes from 1" to 10½", 52100 tubing has been used for aircraft parts, ball bearing races, pump parts and plungers, collets, bushings, spindles, grinding machine parts, precision instruments, plus dozens of other jobs.

The Timken Company's experience—we are America's pioneer producers of 52100 tubing—assures you of uniform quality from tube to tube and heat to heat. Rigid quality control checks every production step.

For immediate delivery of your less-than-mill quantity orders, write, wire or phone The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable address: "TIMROSCO".

YEARS AHEAD—THROUGH EXPERIENCE AND RESEARCH



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TRADE-MARK REG. U. S. PAT. OFF.
Fine Alloy
STEEL

SPECIALISTS IN FINE ALLOY STEELS, GRAPHITIC TOOL STEELS AND SEAMLESS TUBING